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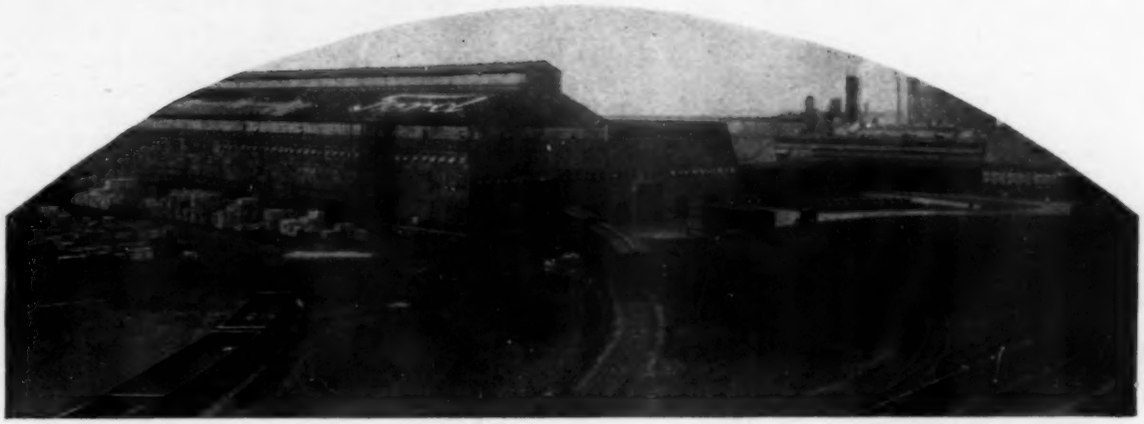


Ford Stock and Traffic Control

By George E. Hagemann

Chairman, Executive Committee, Materials Handling Division, A.S.M.E.

NUMEROUS evidences of efficient management and of marked economy in the handling of material as well as in production operations can be found in any plant of the Ford Motor Company. The Chester, Pennsylvania plant, although considered primarily as an assembly and foreign shipping unit of the company, is in reality a factory in which considerable production work is accomplished. It receives, boxes, and ships about 60 per cent of the Ford export products, comprising parts for about 1,200 cars a day, and assembles normally some 450 to 480 complete vehicles per eight-hour day, or practically one a minute. It performs nearly all the operations of body manufacture aside from cutting and stamping the metal parts and forming the wood body reinforcement members. About 2,300 men are employed in the domestic division, and some 2,700 in two or three eight-hour shifts in the export division.

The first of five articles dealing with operations at the Ford plant in Chester, Pa. Later articles will describe the methods followed in body assembly, body finishing and trimming, chassis assembly, and the packing of parts for export.

Approximately 75 carloads of parts and stock come in from the railroads each day. Most of this material comes from the main Ford plants in Dearborn. The remainder is shipped in from other Ford plants and from outside firms. Box cars are used for all shipments. About one half arrive over the Pennsylvania and one-half over the Philadelphia & Reading tracks, adjoining Philadelphia. Relatively little surplus stock is carried except for a few of the smaller items, such as bolts, screws, cotter pins, tacks, and similar supplies, which it would not pay to ship in small lots. On such items a five, ten, fifteen, twenty, or even thirty-days' supply may occasionally be on hand. But on regular car parts only one day's stock is kept available. Parts unloaded today are used tomorrow.

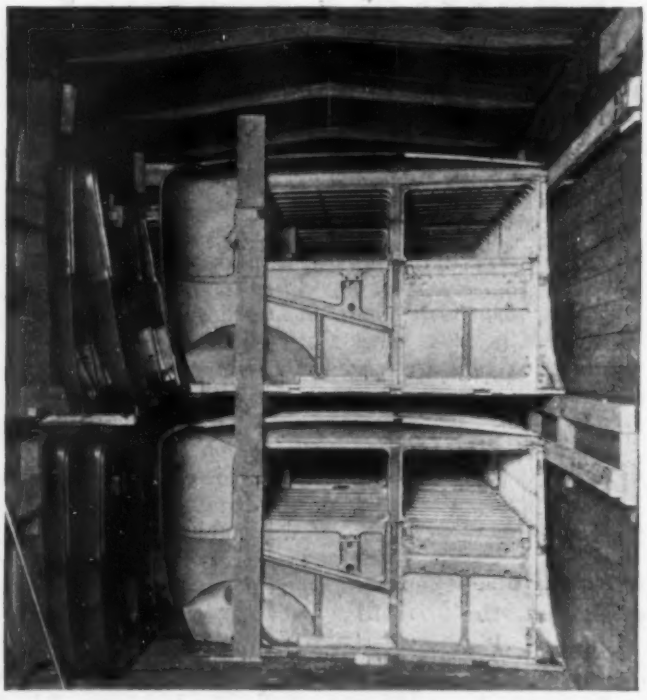
This plan of operation calls for the closest coordination between all departments of the factory and between

the plant and the branch production department at the Dearborn headquarters. A five-day period is selected as the time interval within which to work, that is, five days before the material is to go into assembly it must leave Dearborn, or other source of supply. Five days are allowed for transit and at the end of the fifth day the parts are supposed to be unloaded ready for the next day's assembly operations. Very seldom has production been lost through delayed shipments in the three years that this factory has been in operation, and few special movements of trains have been required.

Twenty stock-checkers at the Chester plant control materials under the direction of a stock superintendent. The stock department must meet the sailing schedules of vessels in the export division, and must keep all departments supplied with parts in the domestic division.

Each day a physical inventory of master parts is taken. Standard methods of stacking parts have been adopted, so that a rule or tape can be used to measure the heights of piles. The checker, knowing the number of layers wide and deep the parts are stacked, can calculate the contents without actual count. The same procedure is used in checking small parts in bins, and for standard supplies, such as bolts, nuts, and washers. Supplies which come in packages are left in their original containers until needed on the assembly lines, in order to facilitate counting. This method of checking is considered more accurate than a card-record inventory.

As soon as the daily inventory is compiled and checked against the record of shipments on the way, a wire is sent to Dearborn listing all items below the five day limit.



Box car interior, showing how compactly body stampings are arranged for shipment into the Chester plant

The Dearborn plant checks this daily report against shipments to the branch assembly plant, and immediately prepares to send out the items on which a shortage threatens.

Shipments are packed so that, as far as possible, all the parts for each sub-assembly come in the same car or cars. To get the maximum weight, service parts sometimes are added.

The traffic department at the branch assembly plant is held responsible for following up shipments. Each morning a wire is sent from Dearborn to the stock superintendent at the branch, listing the car parts shipped the preceding day and also the parts lined up for that day's loading. This wire is reported to the traffic department at the plant and this department keeps in constant touch with the railroads regarding the progress of the shipments. Often this contact is maintained every two or three hours, so that all during the day the traffic departments can tell where each car is, and whether or not it is up to schedule. If only a few cars are shipped, and some slight delay has occurred in transit, arrangements can be made with the railroads whereby these cars will be promptly routed through transfer points so they will catch the connecting trains and arrive on time.

Some orders are placed by the Dearborn headquarters for direct shipment from suppliers to branch plants. The branch follows these and schedules the details of shipments with the suppliers.

Production schedules are planned on a monthly basis, by types of cars. The local sales department gets reports every ten days from dealers in its territory, stating the number of cars on order, by types and colors, and the sales in prospect. These reports are sent in to Dearborn, and from them the monthly schedule is made out and forwarded to the branch about the twentieth of the month preceding manufacture. This schedule is broken down into daily schedules, each in a definite assembly sequence, car for car, so that body, chassis and subassembly lines on all models of cars and trucks feed into the main assembly line in the correct order to synchronize with each other. Knowing the time required for the work on each car at each point along the line, the superintendent can supply the correct number of men to secure the daily output which has been scheduled.

Extensive use is made of overhead chain and various floor-types of conveyors for handling parts between the sidings and the assembly and finishing lines, as well as during assembly, finishing, packing, and shipping operations. Diagram showing the arrangements of these conveyor lines will be included in later articles dealing with various phases of this work.

An Economical Rust Remover

By Charles R. Whitehouse
Holtzer-Cabot Electric Company

AN ECONOMICAL rust remover may be made easily of ingredients to be found in any drug store. The composition is: 3 oz. petrolatum, 2 oz. P.907 oil, and 6 oz. tripoli.

The oil and petrolatum are steamed together until they get "good and warm." Then the tripoli is added and the mixture stirred until it is smooth. When spread on rusty tools or parts and rubbed off with a cloth, this mixture will remove the most stubborn coat of rust. I have found this mixture invaluable, and I believe it should be in every machinist's "kink" book.

RAILWAY TOOLS
in a Canadian Shop

By FRANK W. CURTIS

Various labor-saving devices and operations that aid in lowering repair costs of motive power and rolling stock

Fig. 1—An air-operated device for loading car wheels on the boring mill and for removing the finished wheels

THE main shops for repairs to equipment used in the western region of the Canadian National Railways are located at Transcona, close to Winnipeg. These shops include fully-equipped departments for heavy and light machine work, blacksmith work, boiler maintenance, car repairs, and other branches of railway work. As might be expected, many businesslike fixtures and labor-saving tools are used to aid in lowering repair costs.

Car-wheel work is done in a separate building equipped with modern handling facilities that permit wheels to be bored and axles to be repaired on a production basis. A handling device used in connection with the car-wheel boring mill enables wheel changes to be made in 20 sec., floor-to-floor time. The cycle includes the removal of a finished wheel from the machine and the chucking of a rough wheel.

The device is illustrated in Fig. 1. Directly in front of the machine is a cylinder, attached to the ram of which is a beam made by riveting two channels together, back to back. At each end of the beam is a pair of hooks that can be adjusted to suit wheels of different diameters. The hooks grip the wheels by the flanges. The ram can be revolved in the cylinder, so that either end of the beam can be swung over the machine chuck. In the illustration it is shown in a neutral position.

While a cut is being taken on the wheel in the machine, the operator places another wheel against an elevating platform, which is hidden by the wheel shown at the lower right. The platform is elevated by the ram of an air cylinder, and as it is raised, hooks on the side catch in the ribs of the wheel, picking it up and turning it to a horizontal position. When the platform is at its highest point, the wheel is at the same height as that of the one in the machine. This arrangement permits the cross beam to be brought into such a position that its hooks can pick up a finished wheel at one end, and a wheel requiring machining at the other end. Adjustment of the hooks to both wheels is made by a lever to which they are connected by chains. By raising the lever, the hooks are spread apart and can be placed over the flange of the wheel.

Another view of the device is shown in Fig. 2. Two wheels can be seen suspended from the beam. In the foreground, the elevating platform is in position for a wheel to be removed from it, or placed upon it. The wheel at the left has just been removed from the machine and is being swung around to the elevating platform, while the wheel at the right has been removed from the platform and is to be placed in the machine. When a finished wheel is deposited on the platform, the platform is lowered, leaving the wheel in position to be tipped up and rolled away. Operation of the rams of both cylinders is controlled by means of valves at the right of the cylinder nearest the machine. Starting the machine automatically operates the chuck jaws to clamp

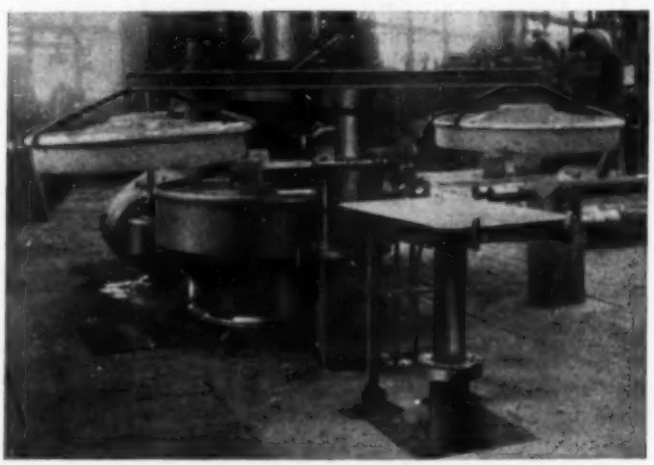


Fig. 2—The beam with a bored wheel and one to be bored suspended from each end

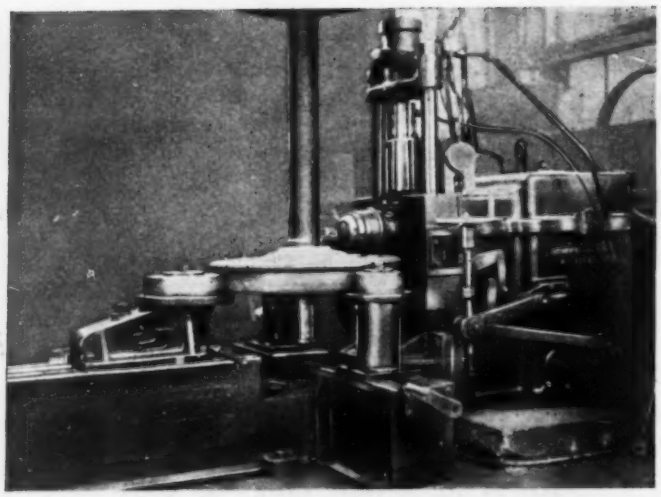


Fig. 3—Steel-tired wheels have their tires locked on the centers by rolling

the wheel, while stopping the machine automatically releases them. This feature, in connection with the handling equipment, has greatly reduced the idle time of the machine.

Steel-tired wheels have their tires secured in place by rolling, as shown in Fig. 3. The inner edge of the tire is rolled into a chamfer machined on the corresponding edge of the wheel center, thus doing away with retaining rings, or the use of rivets or bolts. In boring the tire, a groove is cut near the inner edge, so that the metal will flow more easily over the chamfer on the wheel center. After a tire has been pressed on a wheel center, the assembly is transferred to a hydraulic rolling-press, being located by the tread and the outer edge at three points, as shown. The head of the machine is lowered so that the beaded roll presses against the tire and rolls its inner edge over the chamfer in the wheel center. A constant pressure, checked by the gage at the upper right, is maintained at all times during the operation. The wheel and tire are revolved by the friction of the rolling tool. A 20-ton crane is used for handling the work.

HUB liners are attached to driving wheels by arc welding. Three anchor holes are drilled in each half of the liner, so that the welding material can be applied to both the wheel hub and the liner. To insure holding the hub liners firmly, the air-operated clamp shown in Fig. 4. is used. It consists of a fork attached to the ram of a small air-cylinder, while at the opposite end a backing-up bar is placed against the hub of the other wheel. The welding metal is deposited in the hole between the prongs of the fork, after which the device is shifted to the next hole, where the operation is repeated.

The furnace shown in Fig. 5 is for preheating axles preparatory to building up the worn places by electric welding. The axle rests on a small truck that permits it to be withdrawn from the furnace and turned end for end, or to be revolved upon its axis while one end is in the furnace. One end of the axle is being heated in the furnace while the other end is being built up by welding. The truck is mounted on two small tracks of a length to allow sufficient movement to enable the axle to be placed in, or withdrawn from, the furnace, as desired. A band having four handles is clamped to the right-hand end of the axle to revolve it as the building-up process progresses.

Driving-box hub liners are attached to the boxes by acetylene welding, the liners having countersunk holes through which the welding material is deposited. The driving box is mounted on a revolving table and the liner is held in place by a spider clamp, the whole being covered by a sheet-metal hood, as shown in Fig. 6. The hood has a counterweight attached to it by chains and the smoke pipe is in telescoping joints. By this arrangement, the hood can be raised when it is necessary to change the work. A view of the fixture with the hood raised is given in Fig. 8. At the lower right is a clamp for holding the revolving table when the spider clamp is to be tightened or loosened.

A riveting yoke for use in connection with tank work is shown in Fig. 8. It is made of two sections of 4-in., heavy, seamless tubing joined together at the top by two 1-in. plates. The throat of the yoke is 66x12 in. An

Fig. 4—Hub liners are held in place on driving wheels by an air-operated clamp to insure proper seating for welding

Fig. 5—Preheating axles before welding. The axle resting on the revolving table of a truck, can be revolved on its axis or turned end for end

air hammer is attached at the lower end of one of the legs, being held by a clamp that permits adjustment to or from the anvil. The yoke is handled by a crane and can be suspended in either a vertical or a horizontal position.

A small air-operated hammer for miscellaneous work is illustrated in Fig. 9. The tool to be seen in the machine is for swaging copper ferrules after they have been cut to length from tubing. The ferrules require to be slightly tapered and the work is done by placing them in the die and forcing the punch through them. Two of the ferrules can be seen at the right of the operating lever.

In valve setting, the driving wheels are revolved by

rollers placed under them, the rollers being driven by an electric motor through reduction gearing and a shaft having universal joints. Speed is reduced through spur and worm gearing.

A portable, air-driven boring bar is used for reboring the cylinders of air-brake pumps. The cylinders are mounted on the floor stand, after which the boring head is attached to the flange of the steam cylinder by a clamp ring. The outer end of the boring bar is supported by a spider attached to the end of the air cylinder. Drive is through differential gearing.

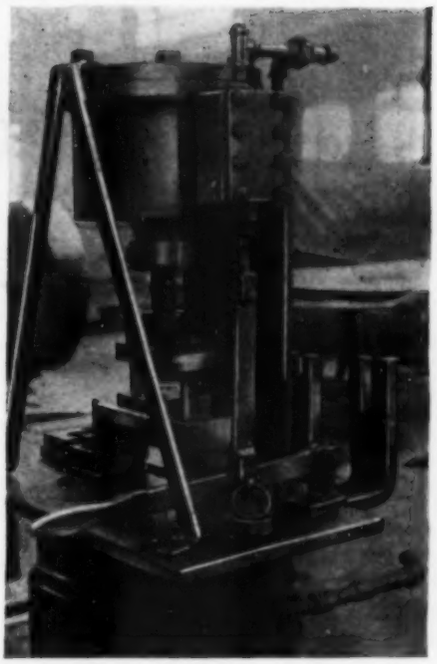


Fig. 9—An air hammer used in connection with the boiler and flue repairs

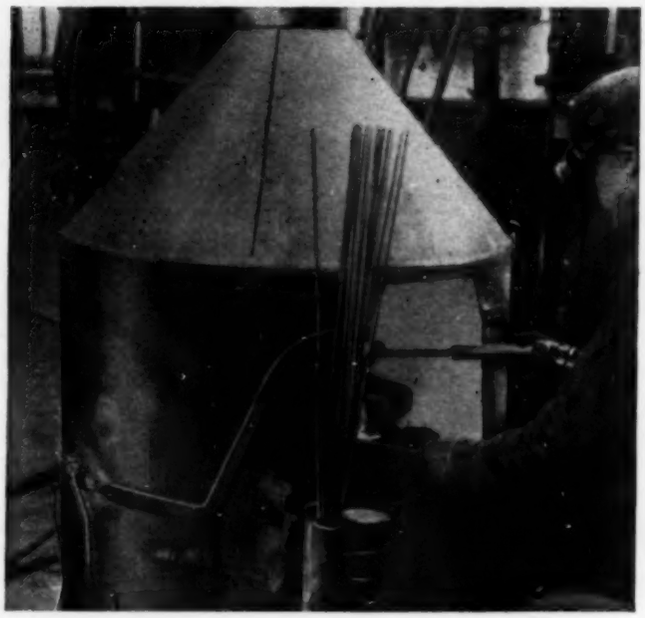


Fig. 6—Attaching a hub liner to a driving box by means of oxy-acetylene welding

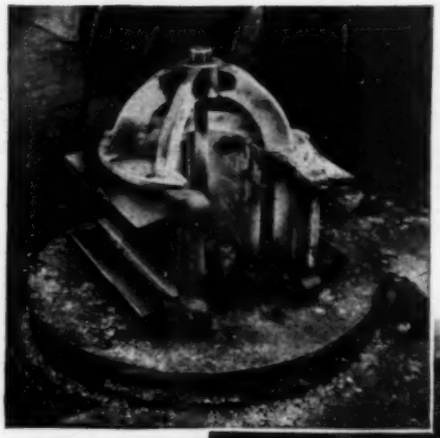


Fig. 7—The welding fixture with the hood raised. The work is located on a revolving table and held in place by a spider clamp

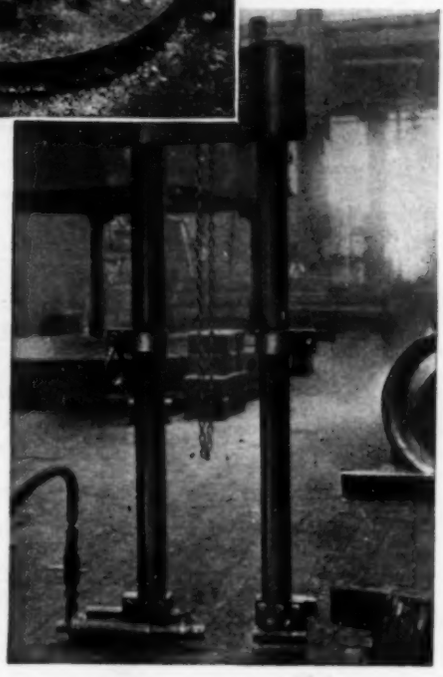


Fig. 8—Riveting yoke used in connection with repairing tenders. The air hammer can be adjusted to suit the thickness of the work being riveted

Weights of Round Steel Bars

By L. F. Swenson

Industrial Engineer, Perkins Gear and Machine Company

IT OFTEN happens that the weight per foot of round steel bars is required when no handbook is available. A simple formula that may often be solved mentally is as follows:

Square the number of quarter-inches in the bar diameter and divide by six. The result gives the weight sought.

This method applies to all sizes of stock and gives results very close to those found in tables on the subject as shown by these examples:

Size	Computation	Weight per Foot — By Formula	Weight per Foot — By American Machinist Handbook
$\frac{1}{8}$	$\frac{.5 \times .5}{6}$	.042	.042
$\frac{1}{2}$	$\frac{2 \times 2}{6}$	.666	.667
$1\frac{1}{16}$	$\frac{4.25 \times 4.25}{6}$	3.010	3.014
$1\frac{3}{4}$	$\frac{7 \times 7}{6}$	8.167	8.178
$2\frac{1}{16}$	$\frac{9.25 \times 9.25}{6}$	14.26	14.28
$2\frac{13}{16}$	$\frac{11.75 \times 11.75}{6}$	23.01	23.04
$3\frac{3}{4}$	$\frac{15 \times 15}{6}$	37.50	37.56

Speeding Tool Design

With Typical Outlines

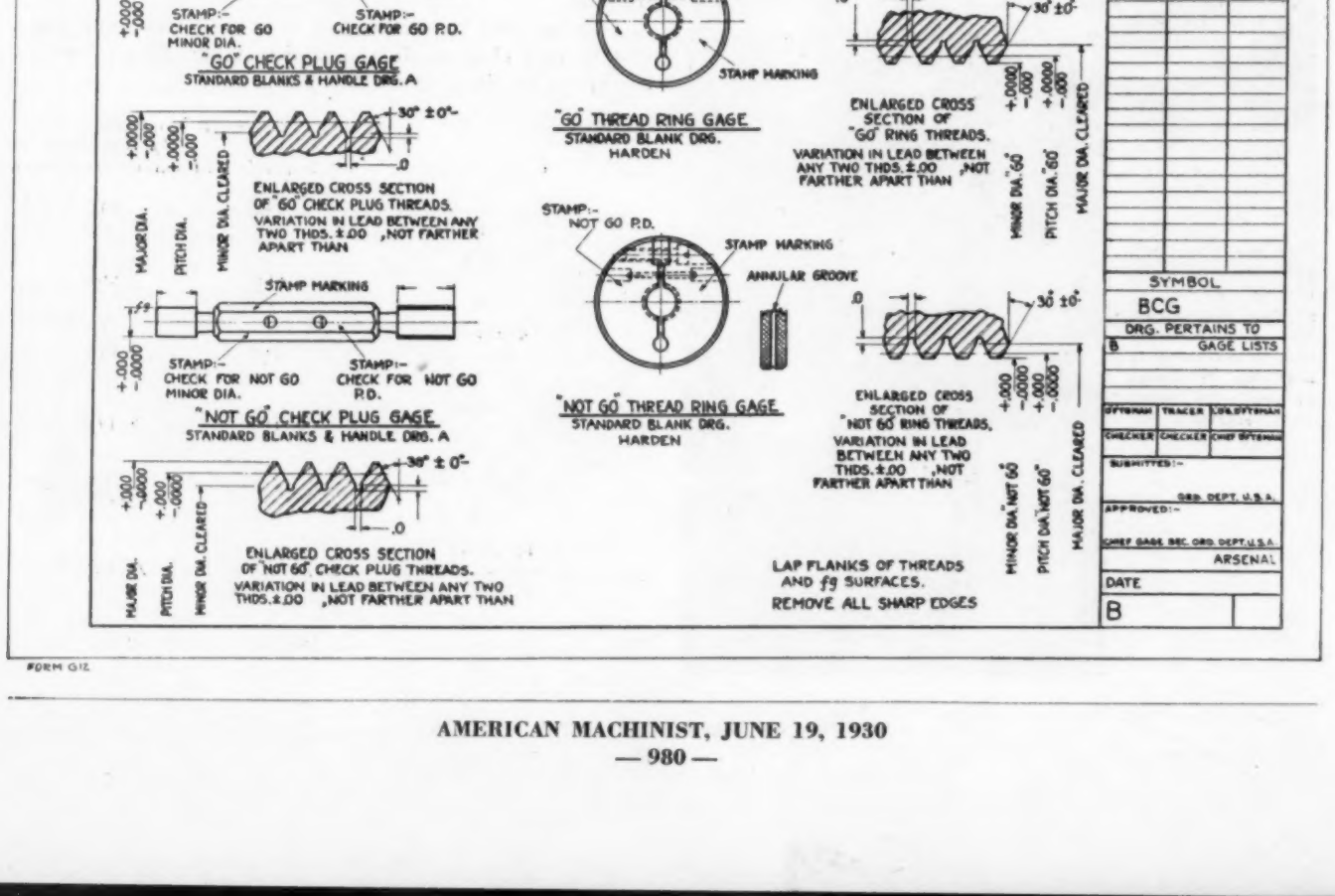
By Col. John O. Johnson

Chief of Gage Division, Ordnance Department, U. S. Army

EXPENSES have been cut and hand labor minimized in the drafting rooms of the Army Ordnance gage division by the very simple expedient of printing typical outlines rather than laboriously tracing them. The method can be appreciated at a glance by reference to the accompanying cuts. For ordnance work, gages of the type shown are used in many classes of machining operations and on many special jobs. Obviously, the dimensions of a given type of gage vary with the desired uses; still the outline remains the same. This outline with blank dimensions would take hours of hand drafting, but can be run off in one stroke by any one of a number of commercial printing methods. The prints are on tracing cloth from which may be taken the blueprints needed for production control.

Time is saved, not only in the actual speed advantage of the printing press over hand labor, but through the uniformity thus attained. A dozen draftsmen normally would do a given sheet a dozen ways, some of which would be cumbersome and confusing. In the ordnance gage drawings, a great deal of thought is devoted to developing the best possible layout. When this layout is printed, the draftsman is spared the labor of arranging his sheet. He simply has to fill in a few dimensions and notes, and perhaps, to draw cross-hatch lines over a part of the printed form which does not apply to the job in question. The checker shares the advantages of this simplification. He only has to look at perhaps twenty points on a large sheet instead of a hundred. This speeding up process carries through to the shop where workmen get to know a standard print and to read it with an ease not possible when layouts of the same drawing are being shifted due to the human element of individuals in the drafting room.

The Ordnance office requires thousands of gage prints each year. Photo-lithographing on copper plates is the process used, the work being done by the Engineer Reproduction Bureau. Sometimes sheet margins and titles are set up in type. There is no reason why a


STAMP MARKING
STAMP:- CHECK FOR GO MINOR DIA.
STAMP:- CHECK FOR GO P.D.
"GO" CHECK PLUG GAGE
STANDARD BLANKS & HANDLE DRG. A
30° ±0°
ENLARGED CROSS SECTION OF "GO" CHECK PLUG THREADS.
VARIATION IN LEAD BETWEEN ANY TWO THDS. ±.00 ,NOT FARTHER APART THAN
MAJOR DIA.
PITCH DIA.
MINOR DIA. CLEARED
STAMP MARKING
STAMP:- CHECK FOR NOT GO MINOR DIA.
STAMP:- CHECK FOR NOT GO P.D.
"NOT GO" CHECK PLUG GAGE
STANDARD BLANKS & HANDLE DRG. A
30° ± 0°
ENLARGED CROSS SECTION OF "NOT GO" CHECK PLUG THREADS.
VARIATION IN LEAD BETWEEN ANY TWO THDS. ±.00 ,NOT FARTHER APART THAN
STAMP:- GO P.D.
SEAL SCREW AND PIN HOLES WITH SEALING WAX AFTER INSPECTION
STAMP MARKING
"GO" THREAD RING GAGE
STANDARD BLANK DRG.
HARDEN
ENLARGED CROSS SECTION OF "GO" RING THREADS.
VARIATION IN LEAD BETWEEN ANY TWO THDS. ±.00 ,NOT FARTHER APART THAN
MINOR DIA. "GO"
PITCH DIA. "GO"
MAJOR DIA. CLEARED
STAMP:- NOT GO P.D.
STAMP MARKING
ANNULAR GROOVE
"NOT GO" THREAD RING GAGE
STANDARD BLANK DRG.
HARDEN
ENLARGED CROSS SECTION OF "NOT GO" RING THREADS.
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MINOR DIA. "NOT GO"
PITCH DIA. "NOT GO"
MAJOR DIA. CLEARED
LAP FLANKS OF THREADS AND fg SURFACES.
REMOVE ALL SHARP EDGES
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REVISIONS
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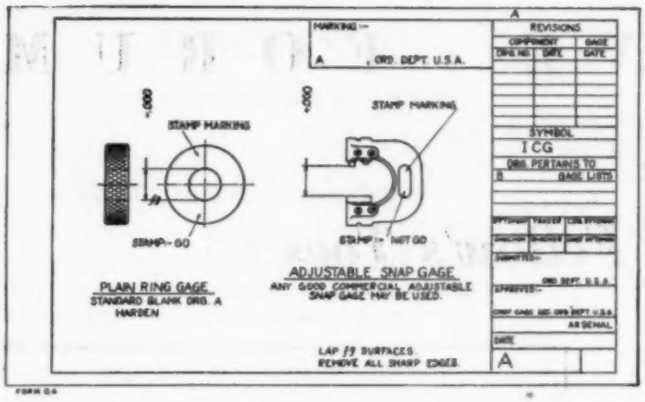
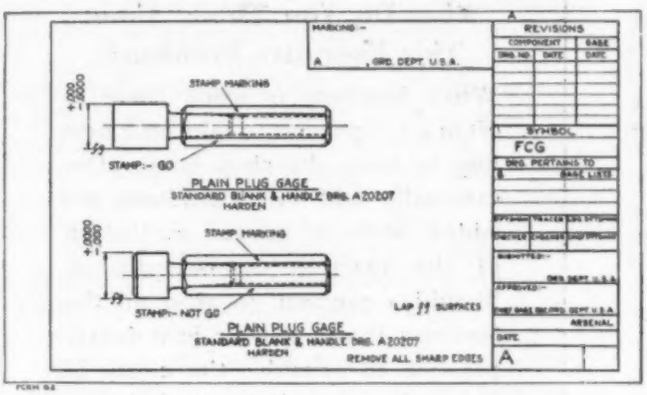
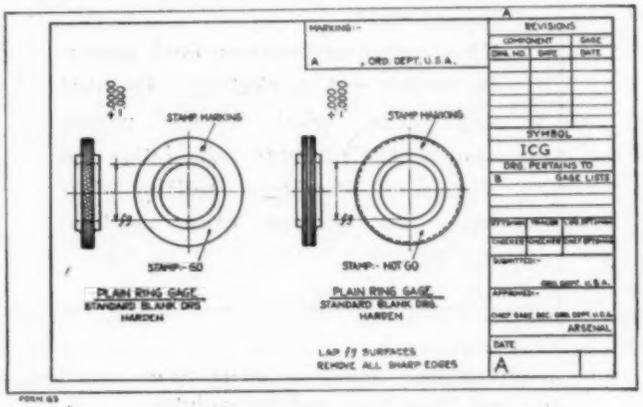






gelatin-base litho-print could not be used for operations on a less extended scale. Prints are made on the rough side of tracing cloth. One requirement is that the printing ink must be of the best quality and must leave the finished sheets so that they will not smudge under the influence of moisture or rubbing. By insistence on the proper grade of ink, this problem has been solved.

In the ordnance work, the printing method has caused an increased output of prints rather than a saving, and so direct cost figures are not applicable here. It is safe to say, however, that the expense is not one-tenth that of drafting by hand.

So far as is known, this method is entirely new to drafting practice, printing having been applied heretofore only to margin and titles and for the occasional duplication of finished sheets. Its marked success in the gage field promises widespread applications in any large drafting room dealing with a repetition of some standard form, be it a machine part, a concrete beam, a steel girder, a wooden box, or whatever product falls within the scope of a particular firm.

· BOOK · REVIEWS ·

GENERAL METAL WORK. *By Alfred B. Grayshon, 206 pages, 6x9 in. Illustrated. Indexed. Cloth boards. Published by D. Van Nostrand Company, Inc., 250 Fourth Ave., New York, N. Y. Price $1.70.*

METAL WORK has been obliged to play "second fiddle" to wood work in many a vocational school, one reason, perhaps, being the lack of adequate elementary text books and project books. But Mr. Grayshon, who has been instrumental in establishing a course in metal work in the Philadelphia Public Schools, has compiled a book that should receive immediate acceptance. It contains five well-illustrated chapters on tools and processes, including sheet-metal work, vise work, drilling, taps and dies, and lathe work; 63 projects, ranging from a simple metal scoop to a sturdy toolmakers' vise; and 22 pages of useful formulas and tables. It is to be recommended to any vocational school looking toward the strengthening of its course in metal work, and to any man or boy desiring the rudiments and some of the finer points of the art.

NATIONAL ORGANIZATION AND INDUSTRIAL RELATIONS. *Published by the International Industrial Relations Association, The Hague, Holland. Two hundred seventy-nine 6⅛x9¼-in. pages. Price H.Fl. $3.50, post free.*

THIS VOLUME presents a symposium of the views expressed at the 1929 discussion meeting of the Association held at Schloss Elmau, Klais, Oberbayern. Contributions were made in English, French, and German, and translated in each case to the other two languages.

Human relations in industry, the subject of discussion, is ever an absorbing theme, and at the present time when most European countries are in the midst of an economic transition, it holds more than usual interest. The points of view of management, labor, and social science, all found expression at this meeting.

A few of the topic titles may serve to illustrate the trend of thought: "Groups as Fundamental Factors in Industrial Relations"; "Rational Organization"; "The Determination of the Optimum Hours of Work with Special Reference to the Five-day Week"; "The Job and Its Conditions"; "Personal Policy and Procedure"; "Industry—A Science and an Art"; "Rational Organization as an Element in the Evolution of Economic Life"; and others. The discussions reflect a sincere endeavor to clarify industrial relations, to elevate living standards, and to promote the cause of human happiness.

STANDARDS YEAR BOOK—1930. This book has been compiled by the U. S. Department of Commerce, The National Bureau of Standards, and is designated as Miscellaneous Publication No. 106. It is the fourth issued so far and treats especially of the important and significant standardization activities and accomplishments in transportation. The work of technical societies and trade organizations with respect to standardization is also outlined. Copies may be obtained from the Superintendent of Documents, Washington, D. C., for 75 cents.

The Other Fellow's Toes

"WELL, I'm on my way, Mr. Coakley," said Walter Howe, sales manager of the Mid-City Machine Works, as he entered the president's office. Howe was starting on a three weeks' trip to visit the company's district sales offices and do what he could to stimulate their activities. As was his custom, he dropped in for a few final words with his senior executive before taking his departure.

"Good luck, Howe," said Coakley. "Remember the shop is behind you every minute. Be sure to call on us if there is anything we can do to help."

"What would you think of extending our present line of paper mill machinery?" Howe asked. "Just now a great deal of news print business is going to Canada, and domestic mills are turning to finer grades of paper. Jordan engines are in demand, and I feel sure we could make them at a profit."

"But how about the manufacturers in the field at present?" inquired Coakley. "Haven't they facilities to supply the needs of the industry?"

"No doubt they have, but I know I can take some of the business away from them. Through our sales of screens and chippers, we have made some good friends in the paper mills. We could handle a few sizes of jordans with very little increase in sales expense."

"As soon as business eases up many manufacturers look around to see what their neighbors are doing. Often they will extend their lines to include wider ranges of product. This practice has done a great deal of harm in industry."

"The tendency is natural enough," agreed Howe, "but I don't see that it does any particular harm."

"The trouble is that the other fellow doesn't like his toes stepped on," said Coakley. "Being human, he fights back. If we should start making jordans, we would soon find other companies making screens and chippers. In the long run, we would have many companies making a wide variety of products."

"Doesn't the law of the 'survival of the fittest' determine the result?" asked Howe. "The strong concerns would stay and the weak ones go. The result would be larger and more efficient manufacturing units. It seems to me that industry would profit by such an evolution."

"Not necessarily. By specializing in definite fields a number of companies can make profits and render good service. When they start to diversify their interests, they may increase gross sales for a while, but each works on a smaller margin and is less able to give effective service."

"That sounds well as a theory, but my job is to keep the shop busy. If our present line doesn't enable me to do this, we should supplement it with a new one. Too many companies have gone under by sticking to their old product until the sheriff locked their doors. My idea is to find out where the busines is and go after it."

"Don't take my stand as being opposed to progress," said Coakley. "A normal expansion is desirable in any concern. However, the way to advance is to do constructive designing ourselves —not merely attempt to steal the other man's thunder."

What Do You Think About This Executive Problem?

When business is slack there is often a temptation to take on a new line to keep the shop busy. Occasionally additional products are added without proper evaluation of the reaction on competition. Should a concern go after all the business it can get, or is it better practice to consider the effect of this policy in relation to industry in general?

This question involves both manufacturing and marketing. In your experience, what is the wisest course to pursue? A letter to *American Machinist* telling your ideas will interest other readers.

DISCUSSION

OF PREVIOUS PROBLEMS

Should Overhead Be Uniform?

Overhead or expense can be uniform in certain enterprises and be perfectly practical and satisfactory. The shops using the uniform method successfully, however, must have machines practically uniform as to size and cost or be producing commodities of about the same size and character. As soon as the general contract or jobbing field is entered, the uniform overhead system must be abandoned if accurate costs are to be obtained. How can the overhead on a boring mill costing $25,000 be the same as on a lathe costing but $1,000? Or how could it possibly be the same as on a producing worker in the assembling department where there is no machine investment, repairs, power consumption, depreciation and the like to consider?

Every large machine should be treated as a department in itself, upon which a standard hourly expense, determined accurately, should be assessed. Small machines should be grouped and a percentage of direct operative labor assessed. Assembly departments may be carried separately or combined with the small machines group for the reason that the small amount of jobs requiring only assembly operations would not warrant a separate rate of overhead for cost purposes. In either case the charge should be a percentage of direct labor. —R. E. LONG,
Steacy-Schmidt Manufacturing Co.

Should Price or Payroll Be Cut?

During the past year, we met this "old friend" ourselves. We were asked to quote on a large order for dies, involving several thousands of dollars. We needed work and we had good men. Wishing to keep them, we submitted a price with the understanding—which was mutually satisfactory—that we build a specific unit of the whole job at the price rendered. At the conclusion of this unit, we were to establish the real price, which we fully believed would be lower.

At the end of sixty days, we discovered that our price was too low, and that we would lose on the initial order. We completed it and presented the whole matter to the buyer with the advanced price. The customer stood pat and refused the increase, suggesting that he often lost money on his work to keep his force busy. We needed his business, but after serious thought, turned the order down. Before the lay-off became necessary, however, we took in other work that was profitable, the tide turning our way in this instance.

In the case of large concerns employing thousands of men, the labor market is undoubtedly a chief factor. But a small concern that has good men who have virtually been with the company since its beginning, and on whom much time and money have been spent in training, men who know every tool and are acquainted with work to such an extent that they hardly need blue prints, such a firm can not afford to lay off these men hit-or-miss. It seems wiser in such cases to lower the price and keep the men busy, regardless of profit or loss. To be sure, one must consider the amount of the loss and the approximate length of time the shop will be tied up on unprofitable work.

—RAYMOND H. DAUTERICH,
The Crescent Engineering Company.

Is the Customer Always Right?

Although the engineering service demanded by customers may seem excessive to equipment builders, the rendering of such service often furnishes the equipment manufacturers with new ideas for improvements. It also, in many cases, opens the door to the inner production circles of the purchasing company.

A good engineer, who is able to help a customer overcome his troubles, may at the same time study the requirements of the customer's plant. He will also discover weaknesses that are the most prolific source of servicing demands, and will thus enable his company to build machines so designed that the requirements for servicing will be greatly reduced.

—JOSEPH BELL,
Naval Aircraft Factory.

Sales or Sincerity?

More sales effort is ruined by misrepresentation than by almost anything else. Orders that can be obtained only by promising things about which there is some doubt should be refused.

There are such things as profitless sales, and the easiest way to make them is to promise everything the customer demands. Of course the customer is always right, but a real salesman and sales department lead the customer to want the things the company can deliver at a reasonably early date. The business of the sales manager is to sell the product as the company can deliver it, and when he makes impossible promises through ignorance or a mistaken attitude, barriers are raised which hinder sales effort and make the work of the salesmen more difficult. The job of selling is hard enough without adding any unnecessary obstacles. —L. O. BROWN, *Tool foreman, Holcomb and Hoke Manufacturing Co.*

Who Should Control Routing?

Under the line system, routing is practically mechanical, and the foreman's business is to see that what goes in at one end of the line passes the inspector at the other end. In a tool room or in a shop dealing with a great variety of small jobs, the route followed by any particular job depends on many independent factors which cannot be conveniently put down on paper. A rigid

routing system is therefore unworkable. In this case, the foreman should do his own routing and be held responsible for delivery dates.

Most machine shops may be placed somewhere intermediate between these two categories, and the best routing method will therefore vary. In the average case, all jobs can be routed along an imaginary line by the aid of charts, estimated times, tables of machine capacities, and experience. Nevertheless the actual conditions with which the foreman is continually in contact are likely to vary sufficiently from the theoretical one known to the routing department to make some flexibility necessary. This is best attained by having both foreman and routing department report to the same executive, who is then responsible for their combined efforts. This results in the attainment of deliveries as promised. —H. JAMES, *Birmingham, England.*

Pensions or Leaky Payrolls?

The large companies lean towards pensions because they can carry out a plan reaching over many years. They also derive benefits from reduced labor turnover.

Smaller firms cannot do better than to carry aging men along to a point where financial considerations make it necessary to let them go. In many of the smaller shops, where jobs are not so specialized, old men can readily compete with younger ones, due to long and varied experience.

It would not be a good condition to have all shops using pension plans. A firm has a perfect right to set a minimum number of years a man must work there to receive pension. This condition would make it very difficult for men over forty-five or fifty years of age to find work regardless of ability. Furthermore many men would object to a condition that would require them to select the last place they can work while in their prime for the sake of a pension.

—L. F. SWENSON, *Industrial Engineer, Perkins Machine & Gear Company.*

Should Salesmen Design?

The salesman may always be expected to be in closest touch with the leaders among his trade, knowing their likes and dislikes almost as he does his own. For a company to overlook the force of this knowledge, when it begins to cast around with an idea of changing its product, is simply to throw away an immensely valuable by-product of sales activity. It is one of the chief values of a salesman that he is in position to know what the trade is thinking. The company which fails to take full advantage of this knowledge is missing something vital.

Of course salesmen aren't going to be able to step in and do the whole designing job by themselves, but they are going to be able to offer a multitude of first rate suggestions which, when properly culled, will give the engineer an entirely new idea of sales. To fail to secure this valuable sales help, because in the past a great part of it may have been either "old stuff" or impracticable, is like throwing away the left shoe of a new pair because it needs stretching. Sales ideas will need some working over, of course, but what of it? There's meat in some of them, isn't there?

—WILL ARMOUR.

Should Overhead Be Uniform?

Inaccurate costs are often caused not so much by faulty expense apportionment as by failure to allocate to the unit of product exact costs of material and applied labor. The advantage of the percentage of labor method lies in its simplicity, and there are many lines of manufacture in which its use is perfectly all right. An hourly rate requires considerable study for its determination, and the machine hour rate is out of the question unless the management is prepared to have time and money spent in a scientific study of all the contributing factors and their relation to each other. This requires an accumulation of data under a thoroughly experienced and competent accountant familiar with all phases of cost work. Amateur efforts along these lines are not productive of right results.

—WALTER F. GILCREAS.

Should Salesmen Design?

Salesmen should certainly be consulted in design, or at least be given the opportunity of submitting their ideas for improvement. In this age of invention, we are selling to a fastidious public. Though statistics of past consumption reveal an apparent demand for a given piece of equipment, this may be altered overnight by preference for an improved article. Salesmen are alone capable of a market study which demands an exact knowledge in advance of what the public or consumer wants.

A certain manufacturer, who until recently enjoyed a flourishing business through the manufacture of several styles of a certain commodity, was persuaded by his engineering department to standardize on a few designs from a cost reduction standpoint. In spite of his salesmen's persistent efforts, public demand was not satisfied and his business passed into the hands of a competitor. Failure to take the salesmen into consultation cost this manufacturer his business.

The alert salesman is capable of carrying on research in the field which is quite equal to that of the laboratory or engineering department in the search of a design. The manufacturer who fails to take advantage of the salesmen's constructive criticisms in forecasting future public demand is overlooking an important and reliable source of information.

—H. S. DEELEY, *Planning Engineer, Johns Manville Company, Asbestos, P. Q., Canada.*

More Chips from Tungsten-Carbide Tools

Discussion—

By Chester B. Lord
Associate Editor

THOSE shop executives who were in the production game when high-speed steels were first introduced, will remember instances of self-induced enthusiasm that brought about an inexcusable waste of money on the part of those who feel rather than reason and was eventually followed by a reaction. Somehow, high-speed steel was going to be a cure-all for what ailed the shop. The result was that it was used in places where straight carbon steel would have been better, and in many more places where carbon steel would have done just as well. These same executives may recognize some of the same symptoms in the case of tungsten carbide.

We shop men are much like women in that "we first abhor, then endure, and then embrace," and when we embrace a thing we hug it so hard that we are likely to kill it by an excess of affection, like a child with a pet kitten. Either we have no use at all for an article, or we use it for everything. Some executives that recognize this susceptibility on their part, deliberately increase their sales resistance in direct proportion to the sales pressure applied. While they may lose the initial benefits of some new articles, they escape the waste of others.

It is because of this tendency on the part of some shop executives to plunge on a new cutting material without preparation or analysis of their own particular needs, that it may be well to comment upon some of the statements made and the practices recommended for tungsten carbide as a cutting tool. The reaction to unqualified statements is bound to affect both the producers of tungsten carbide and machine tool builders when it sets in.

Representatives of the companies introducing the alloy have been conservative in their statements; but to make an article interesting any author must present the unusual, else he has no excuse for having written it.

As an example of this, I quote the following from a recent publication: "Diamond tools were used for machining the tube bases. Dependent upon the quality of the diamonds employed, the periods between dressings varied greatly, from that of one-half hour to three weeks. When tungsten carbide was introduced * * * * the quality of the tube bases could be measured by the time between grinds. Tungsten carbide is not only a new instrument by which tool performance can be measured, but is also a sensitive measuring device of the quality of the material being machined."

In the one instance the frequency of grinding was attributed to variations in the cutting tools, in the other to the material cut. Statements of this kind are natural and unconscious. The observer was not interested in why the diamonds failed, or whether by proper tests or inspection they could not all be made to last 432 hours, as against 220 hours for tungsten carbide; neither did he state the minimum grinding period for the tungsten carbide. Diamonds must be of a certain hardness to be diamonds. They may crumble because of faults, or become soft because they have been heated and their temper drawn, both of which are preventable.

In an article (Vol. 72, page 608), Frank W. Curtis remarks that the "ideal application is one in which the tool is ground as often as the steel tool previously used." There are so many exceptions to such a rule that it will be misunderstood, or at best can only apply to some single-tool machines which play a relatively small part in repetitive manufacture. Still less does it apply to the contract type of manufacturing.

Mr. Curtis recognizes the hindrance to this practice in a succeeding paragraph, but takes into consideration only one factor, the limitations of the machine equipment. This is not necessarily the trouble, and stronger machines will not necessarily make it possible to take full advantage of the new cutting material.

IF that were so, we could use an 18-in. or a 24-in. lathe instead of a 12-in., or a 1½-in. automatic screw machine instead of a ¾-in. machine, and reap the benefit he speaks of, immediately.

Experience has taught that in many cases small parts cannot be done economically on large machines, and that an increase in size or in increased rigidity does not necessarily mean a larger output. I have in mind two outstanding examples of this. In a new plant where I acted as owner's representative and was later general superintendent, the industrial engineers in charge had ordered several shaft lathes for turning motor shafts. This type of lathe was then being introduced much as tungsten carbide is today. It was revolutionary, and was advertised and written about as the only machine for shaft work, because it used multiple tools where only one was used before. Anyone could figure out that the metal removal must be four times as great in the instance cited. It did not work out that way, however. Upon assuming the duties of superintendent I sold the machine; undeservedly, that type of machine had lost its reputation in our shop. To take its place another make of single tool, shaft lathe was purchased. With this second machine a cut could be taken twice as heavy as with an engine lathe of the same size. Not because it was more rigid but because it supported the work better.

The other case was a still popular, heavy, semi-automatic lathe bought for turning motor end plates. An output twice that possible on a lathe or small boring mill was guaranteed, and the accuracy and finish were

guaranteed at least equal to that secured previously. We were informed that the use of this machine was standard practice with motor manufacturers. Two of these machines were also thrown out because the accuracy of the work was not acceptable.

In neither case did the fault lie with the machine tool, but with the engineers who had relied upon hearsay and inspired press articles for their information, instead of upon an analysis which would have shown the machine to be unsuitable for that particular material. Both these machines were much heavier than standard lathes, yet both were inferior on this particular work.

IN many plants, if not a majority, the cutting speed used in mass production, like the two cases cited, is controlled by the nature or rigidity of the material being machined, and not by the rigidity of the machine. The only means of ascertaining what is best is to analyze each case.

I have held, and so far have had no reason to change my belief, that the greatest benefit from the new alloy will be to use it at such a cutting speed as will allow of it being used as a permanent tool on multi-tool set-ups. "Permanent" means one week or longer where all the tools used are tungsten carbide, or as long as it will last, in use with high-speed tools in the same set-up. I am ignoring single-point tools entirely, because they are quickly and easily changed and do not cut much figure in mass production.

The cheapening of almost any mechanical product is brought about by the use of multiple tools and continuous output. Any reduction made in the direction of saving time here, multiplies rapidly. If an automatic screw machine can be made to run day and night for a week without changing tools, the savings made will, in the long run, offset any gains made by using a faster speed.

Every shop executive has had "pipe dreams" of a permanent tool and has been willing to use diamond tools to secure it, but he has always had to consign such an article to the category of perpetual motion, previous to the advent of tungsten carbide. Now his dreams seem to be coming true.

Other advantages on multiple tool work that are not now obtainable, and possibly not obtainable under the higher speed advocated by Mr. Curtis and others, are that, with the present or slightly higher speeds, the alloy tools will continue to cut accurately, like a newly ground carbon tool, and it may be possible to dispense with a finishing cut in some cases, and in others to eliminate reaming. Whether this is possible or not, the general result will be more good pieces with less racking of the machine, not to mention chip troubles.

It is to minimize this racking that heavier machines are advocated, but is it the whole answer? A multiple spindle screw machine, for instance, cannot be made more rigid without increasing its size and the diameter of its drums. The path of a fast movement is not in the same plane as that of a slow one, and if we speed up we will have just as much racking, and fewer accurate parts. A Diesel engine, despite its sturdiness, would tear itself to pieces if run at the speed of a lighter gasoline engine. Even at that, the makers of gasoline engines are spending fortunes to make the moving parts of their motors still lighter so they will not rack. The No. 00 B & S automatic screw machine has a bar capacity of $\frac{5}{16}$ in. The No. 0 has a capacity of $\frac{1}{2}$ in. yet there is a difference of 1,400 r.p.m. in their rated spindle speeds. Why? There is nothing to prevent their being run at the same speed, except that it would rack the heavier machine to pieces. If anyone doubts this let him run one of his $1\frac{1}{2}$-in. automatics at the rated speed of a $\frac{3}{4}$-in. machine and watch the result.

There is insufficient information available regarding the loss of time and material in set-up and tool changes.

It used to be the opinion that in manual operations changing the work slightly reduced the output only while the actual change was being made, but motion study showed that no matter how slight the change, full output was not resumed for the major part of an hour. This is not cited to show that the same thing occurs in the case of a machine, but to show that our ignorance of actual conditions is the same in both cases. A tool change breaks the momentum and continuity of production, and several changes near together put the operator on edge. As a result he hurries, and this does not help matters.

Permanent tools may mean one more machine added to the number that one man can take care of. Much faster cutting speed means more stock handling, longer tool setting to secure accuracy or else less accuracy, and the possibility of an added helper. It is the experience of most shopmen that large parts cannot be machined economically on light machines, nor small parts on large machines.

The ostensible reason for redesigning existing machines for tungsten-carbide tools is to decrease vibration. Do we know enough about the cause and prevention of vibration to say that a different design would reduce vibration, or that it would be best to have the machine heavier? I have seen a 25-ft. boring mill vibrate so badly on a relatively small casting that it was necessary to shut it down. A change in the angle of the cutting tool stopped the chattering.

ONE rate of vibration may be damped or diminished by a different rate of vibration, or by the same rate out of synchronism. We do not know until we experiment further, whether a more rigid machine may not confine the vibration to the piece being machined, or to the tool itself, in which case the brazing would suffer. A light machine will, under some conditions, absorb or dampen vibrations set up in the work and tool post.

Makers of tungsten-carbide tools recognized the fact that rigidity may not be the answer and are advocating still higher speeds, claiming better results. This result is to be expected, because the path of a fast moving object is more nearly a straight line, and the vibrations caused by the faster cut dampen the vibrations caused by the tool digging in and springing out. A coolant sometimes has the same effect.

This brings us back to our original contention that a heavy cut cannot be taken at a high speed, hence we cannot set a feed and speed that will necessitate definite grinding periods. If we do, we will again zig-zag the tool and set up destructive vibration. It may be that the answer is light running ball bearing machines and not heavy rigid ones. Extremely high speeds, and tools with zero side clearance and 30 deg. top rake have given remarkable results with steel tools, and would probably do the same with tungsten carbide. A high-speed steel tool with zero side clearance does not vibrate sideways when traveling at high speed, or to be more accurate, the amplitude of its vibration is not noticeable.

In a Chinese Shop

By JOHN R. GODFREY

IN TIENTSIN, CHINA, I visited a machine shop that is probably typical of many others in that part of the world. It is a British concern, but all the employees, except those of the engineering department and the management, are Chinese. The work is as varied as can be imagined, and includes the making of cast-iron boilers for house-heating purposes, repairs of all kinds, and the building of machines on contract.

All castings, both iron and brass, are made on the premises, and forgings are made under hammers of various types—incidentally, the air-driven hammer is quite a favorite in the Orient. Instead of using a blower for the forge fires, however, the native blacksmith prefers a hand-driven air pump of the rectangular type shown in Fig. 1. The piston *A* is claimed to be packed with chicken feathers around the edge, and is reciprocated in the rectangular chamber by the two rods *B*, by means of the handle *C*. According to reports, it does the job so well that considerable pressure is secured. The flap valves *D* and *E* control the flow of air in and out of the cylinder, and the two air outlets *H*, lead into the tuyère.

One job showing commendable ingenuity was that of building two hoisting-engine outfits. As these had to be transported into the interior, probably by pack animals. it was necessary to make the units in sections of such weight as could be handled easily. On this account, the frame was bolted instead of welded. The method of making the steam chest cover joint, as shown in Fig. 2, is interesting. Being designed at an angle, the valve seat can be planed from the low side, thus avoiding "blind" planing with a long tool. The valve seat *B* is planed

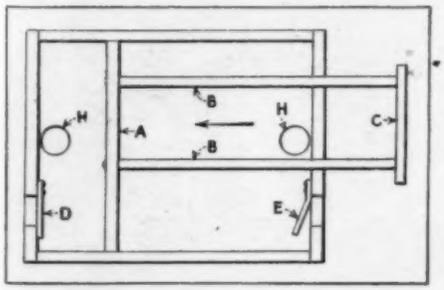


Fig. 1—A Chinese conception of a blacksmith's forge blower

easily by starting the cut at *A*. This, of course, is not a new design, but its adoption is to be commended.

The proprietors reported that the Chinese make very good machinists, and they seemed to be handling the various planers, lathes, drilling machines, and other tools about as in the average job shop. Although there was one old Garvin milling machine on the premises, the great majority of machine tools were of British origin, as is natural considering the management. Probably no machine in the shop was less than 20 years old.

Management matters, as we know them, have practically no application in a Chinese shop, but management, from the angle of the man in the shop, has a slant all its own. Each department has a head, or No. 1 man, a native Chinese, and all matters pertaining to this department go through him. He hires all his men and collects a fee from each, which may vary from one to three dollars a month, this being known as the "squeeze." The No. 1 man maintains discipline in his department, though just how he does it is something of a mystery, since dis-

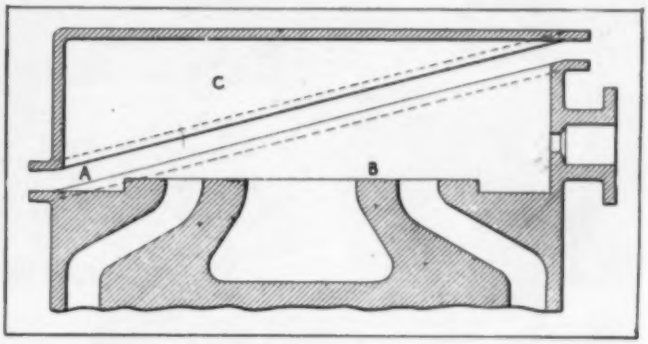


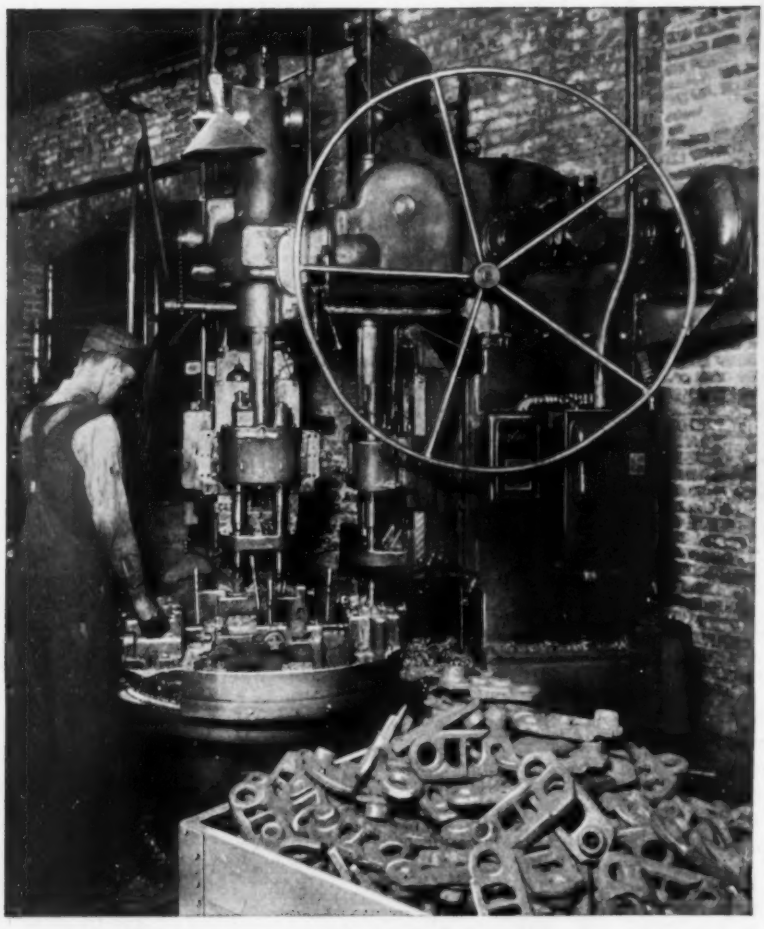
Fig. 2—Hoisting engine steam chest with angular joint to facilitate planing the valve seat

charge has no terror for the Chinese worker. He merely lives on his friends until another job comes along and offers itself.

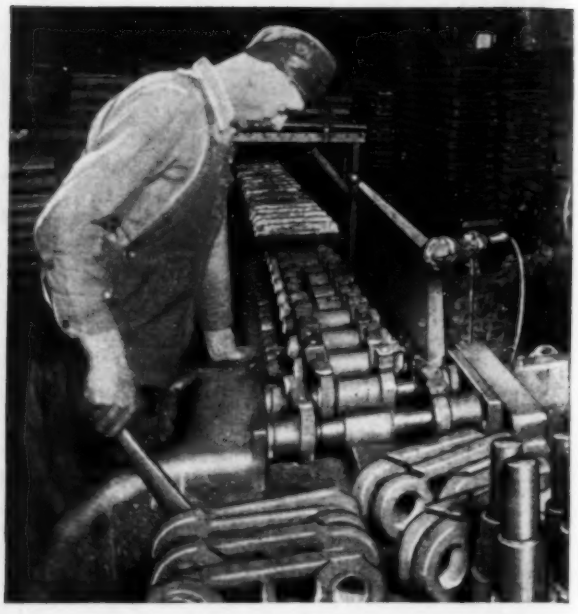
Another jolt to our ideas of management was brought out by my observation of the condition of the belt on the Garvin miller.

"I know it's in bad shape," said the manager, "but if we put a new belt on that machine tomorrow, we are very likely to find the old one back in place next week. The new one will be half-soling someone's shoes. The Chinese look at that as their "squeeze," and it's hard to prevent things like that from disappearing. Sometimes some valuable material is lost, and if discovered in time we generally get it back by telling the No. 1 men that the value of the articles lost will be deducted from the pay of the entire shop. And it never does to ask any questions when purloined articles reappear as mysteriously as they went."

THERE is a growing use of aluminum paint in many shops. It reflects light well, cleans easily, and is said to wear well. In one shop at least, it is used on the floors outside the aisle markings to reflect light into the shop and onto the work. It isn't a new idea, for I saw it used over thirty years ago, but it has come back.

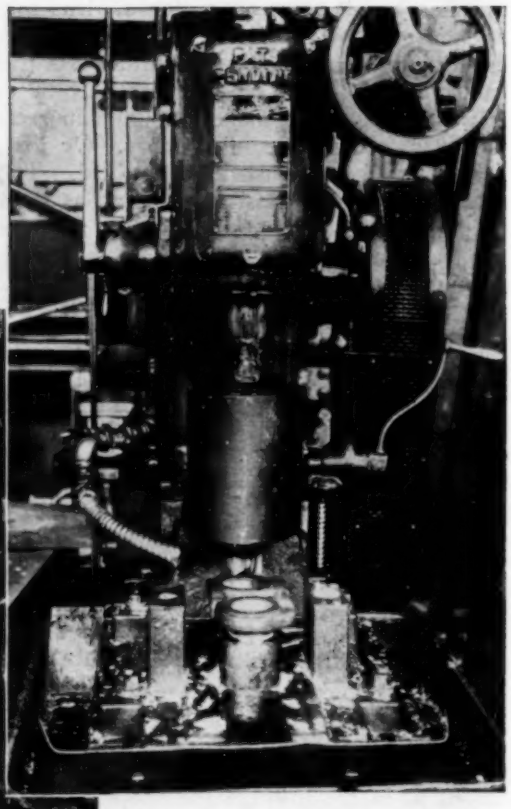


The first machining operation on the rough link forgings is to bore out the pin holes at each end. A four-position indexing table is employed in conjunction with a duplex-head drilling unit

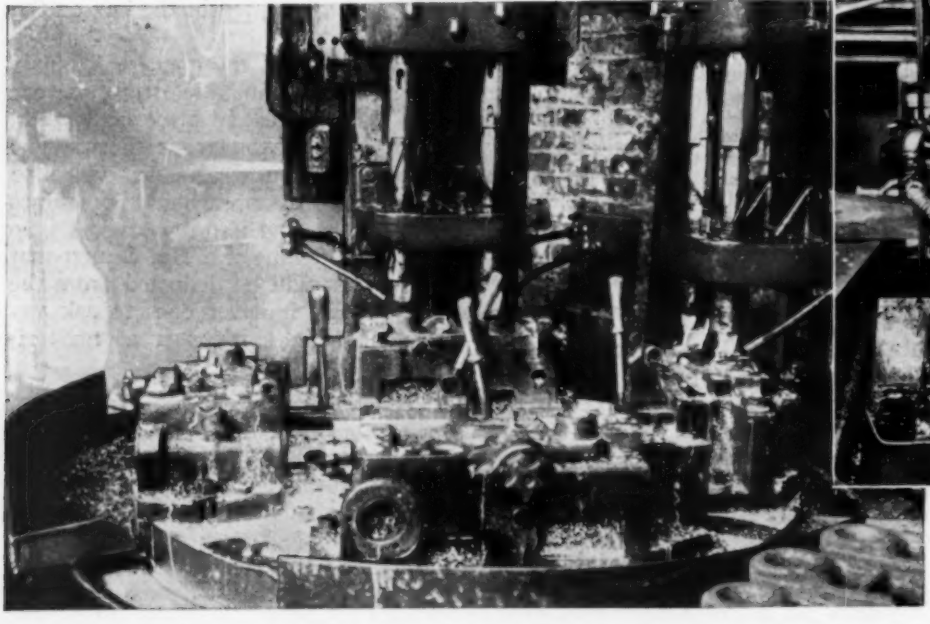


TREADS FOR

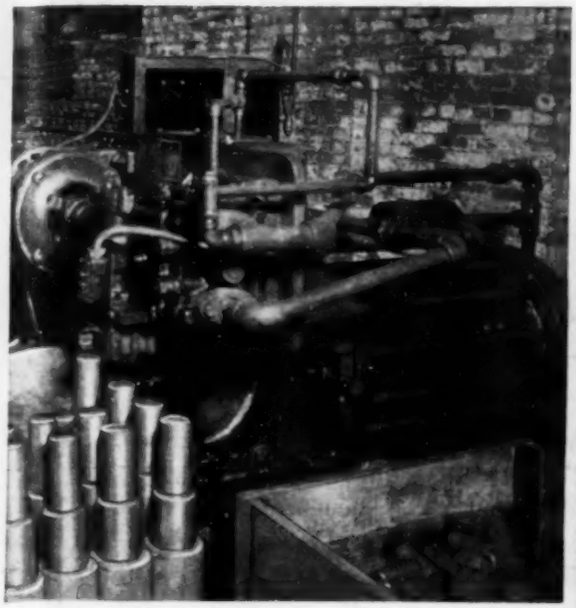
Machining and Heat Treatment



Close-up of the indexing table. Two links are bored, while two are loaded

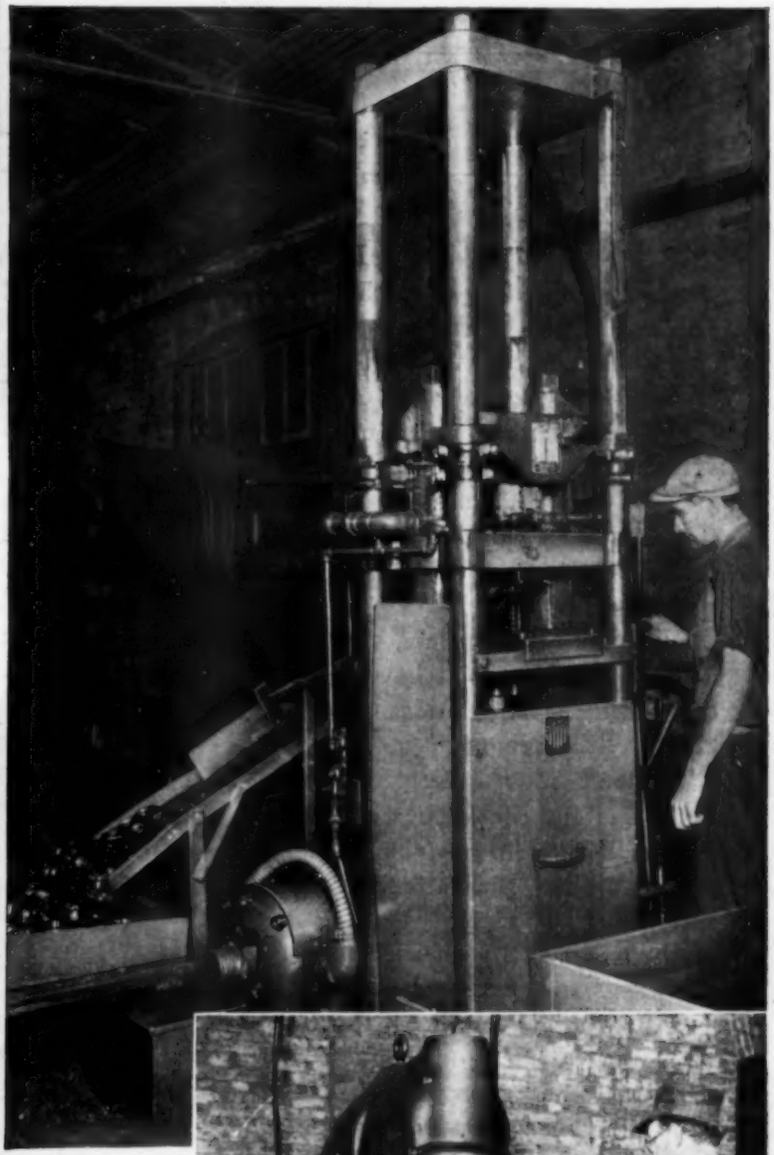


The smaller of the two pin holes is countersunk to 2-in. diam. in this hand fed unit



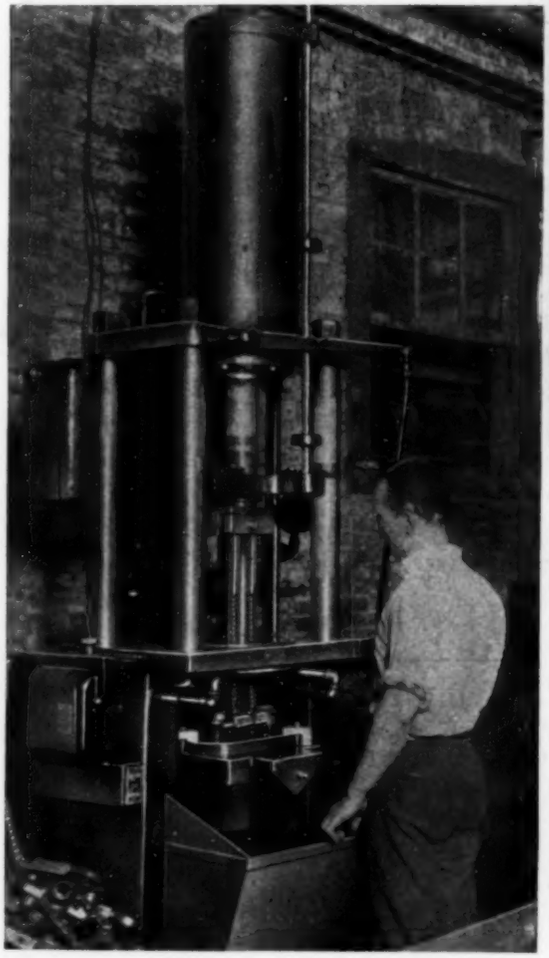
In assembling the treads, the side members or links are simultaneously pushed on the pins which carry case-hardened bushings. High-carbon, formed steel shoes are bolted on to complete the track

TRACK-TYPE TRACTORS



With this hydraulic machine the pin holes are finished to size by broaches, one piece at a time

By means of a continuously rotating table and vertical spindle miller with inserted-tooth cutter, the bottoms of the links are faced for attachment to the track shoes



Burrs are removed and a seat finished for the nuts with this broaching machine

The following narrative is a "case" presentation of the topic. It has been written to involve some of the questions that arise in the average shop. For guidance in preparing discussion the questions given at the foot of the page have been arranged

THE · FOREMAN'S

Honest Graft

"HOWDY, Al," hailed Ed, as the two met at lunch. "What's the good word?"

"Nothing, except that Williams is back in town. How goes your end of it?"

"Fine! I guess I'll go over and see Williams again about my vacation."

"You'd better guess again. Stay away from Williams and tell your assistant to keep out of sight when Williams comes through the shop."

"For the love of Pete, what's the matter now? A fellow don't have any more peace of mind here than he does at home. What's biting Williams now?"

"I don't know exactly, but from what I can learn, the timekeeper asked Williams if it was all right to pay the assistant foremen overtime when they attended the foreman's meeting."

"Why not? I've been okaying my assistant's slips and, never heard anyone kick."

"Well, I haven't been approving *or* disapproving them, and I guess that's what made the timekeeper mention it to Williams."

"Why shouldn't a man get paid overtime for attending meetings? Williams makes them attend, doesn't he?"

"Practically, yes. But I guess he figures that it is all for their own benefit, and therefore they should do it on their own time."

"That's all right from his point of view, but the company gets the benefit of what they learn, doesn't it? If they don't want to pay for it, let them say so, and the boys will donate it to them—maybe. A feller gets tired of this one-sided stuff."

"Holy mackerel, but you are an agreeable cuss. Why should a man get paid for going to school? Doesn't the company do its share when it furnishes the supper?"

"I don't know whether they do or not. After I eat I want to go to sleep, and if the others feel the way I do, they might just as well quit having the meetings."

"Well, anyway, the question is not whether they do or do not satisfy you, but whether the assistant foremen are grafting when they put in overtime for attending the meetings."

"I don't think you ought to call them grafters, Al. They are just as honest as you and I."

"That goes without saying. Such things are called 'honest' graft, and the man that goes after it may be honest, but his code of ethics is not as nicely balanced between right and wrong as it might be. I hope my assistant didn't start that racket."

"Don't worry, big boy; that assistant of yours never started anything."

What are the ethics in this case? Should possible future promotion offset the time spent at foremen's meetings? Should the hourly-rate men receive even straight time?

Foremen are invited to discuss these questions vital to their work; of course the

ROUND · TABLE

DISCUSSION OF EARLIER TOPICS

Keeping Machines on the Job

IT IS only the product that is manufactured and shipped which really makes a profit for the company. The piece parts in the stock room or on the floor are of no value until they have been assembled and are ready for use by some person. Therefore the manufacturing and assembling departments are the real important departments in any factory. All other departments, such as the material control, the time study, and the maintenance department are but servants to the producing departments. These departments should feel that their entire job is to keep the producing departments fully supplied with materials and with machinery and tools capable of producing the product within the limits specified.

Therefore, the maintenance department foreman should be responsible to see that machines are frequently checked and kept in repair so that the producing department foreman can always have them available for making a profit. It is well known that periodic checking of machinery will prevent more costly breakdowns, which in reality saves more time than permitting a machine to run until it does break down. The maintenance department foreman can also co-operate with the shop foreman and get permission to repair a machine between jobs, after working hours, or on Saturday afternoon. In one plant, short repair jobs are accomplished during the noon hour as the maintenance men take their lunch period at 11:00 or 11:30 a.m. This gives them an hour in which to work on the machine and get it ready for the next job.

—E. H. TINGLEY, *Secretary, National Association of Foremen.*

*

Mottoes in the Shop

IF WE had a measuring device to obtain the effect of the value of various posters upon men working in the shop, the question of their value could be easily answered. This not being the case, we have to rely upon our sense of observation, our knowledge of human psychology, and especially upon the working men's way of thinking. The question can only be decided by the combined knowledge of all above mentioned factors.

Many of these posters are not so constructed as to hold the interest of the working men. Most of the latter glance at them as mere curiosities and forget them.

War posters cannot be given as an example, because public opinion at that time is stirred through the existing mental state of the masses. It does not take much to arouse an excited mind already working along lines parallel to a desired end.

Comparing the workers' way of thinking with that of the aforementioned mental state, we will see that we have an entirely different condition to deal with.

Therefore, posters, in order to be of value, must consist of the following essentials:

1. They must carry a note of personal interest to the worker, not emphasizing that of the concern alone.
2. They must appeal to and stimulate the imagination, thus forcing him to analyze and draw conclusions.
3. They must be instructive.

In my opinion, they should carry out a working scheme in which each poster is a follow-up of the preceding one, thus forming a series of short lectures easily to be understood, remembered, and practiced.

—J. DECKER, *Mechanical Engineer, U. S. Rubber Company.*

*

The Chain Store Problem

I HAVE seen the effects of the selling privilege and the abuses of such privileges in a number of plants. It is just as Ed states; you allow one person to sell something, and in a short time you discover you have started a department store.

If there is any virtue in selling to employees, it should be conducted by the factory management. It is best done by having a man go through the plant once or twice a day. I have seen this tried, and it works out fairly well.

—WM. C. BETZ, *Master Mechanic, The Fafnir Bearing Co.*

*

Off with the Old, On with the New

DOES the average workman take pride in the condition of his machine tools? If my experience counts for anything, he does not. As long as a machine turns out satisfactory work in quality and quantity, its appearance does not bother the average workman. You would think that a man put to work on a new machine would take a special interest in keeping it in good condition, and yet an experience I had several years ago dissipated that notion. Four new machines were put on production under four men who had been working in the shop for a number of years. At the end of six months three of those machines looked as if they had been in service several years, and yet the same kind and quantity of work had been done on each of them. The thought of the average workman is that a machine is made to get out the work, and not to be kept looking pretty.

—C. H. LATTNER.

*

Off With the Old, On With the New

FIRMS with enterprise enough to purchase new equipment deserve to get support from the best kind of mechanics.

The writer, away back in 1901, was going home from work one evening. He overtook a dray load of new

discussion is not limited to foremen. Letters accepted and published will be paid for

Cleveland Automatics and followed them to their destination. The next morning he started work in charge of the new automatic department.

He has always carried that lesson with him, and when he is putting in new machine tools himself, he "tells the world," and applications follow.

Appearance certainly has an effect on applicants. Grading the points in order of merit, a mechanic would be afflicted with "cold feet" by the following conditions: (1) Line of talk and appearance of the foreman; (2) noisy gearing, chattering lathes, sloppy workmen, and bad ventilation. It is a strange thing that screeching planer belts impress one favorably; (2) Uncertain prospects for earning much above the rate.

Keep your plant at top efficiency, encourage hustle, pay adequately, and you should never lack good workmen.

—A. T. FANN, *Sheffield, England.*

*

New Drills and Old Men

IT IS my opinion that Al has the proper method in mind, but I would go one step further and say that this is not the proper time to fight this battle.

The facts of the case are that foremen have to handle men from all walks of life. The trouble is not so much in the men as it is in the commanding air of some of the foremen. The result is that the men do the work under protest, in their minds if not in other ways.

The foreman should learn to know his men individually, their thoughts in relation to their work and surroundings, as well as to the other fellow. If the foreman knows his men, he should have very little trouble in getting results.

Here is the point. All foremen should treat their men just as they wish the men to treat them. Give your orders with a smile, rather than with the air of authority.

—S. C. HILL, *Foreman, Crank Shaft Machine Company.*

*

Closing the Door to Late Comers

PERHAPS it may be all right to lay a man off for being late, if he persists in it. However, if such tactics are used with all who may happen to be late, I would expect many of them to go home feeling that they would like to spend the day looking for a different job.

Several years ago I saw worked out a plan I like much better. In a certain small plant employing 40 or 50 men it had almost become the rule for many of them to be late. Also, they worked Saturday afternoon but went home one hour early and did not receive pay for that hour.

To cure this, a so-called efficiency chart was posted each week. This chart was merely a list of the employees' names. Those who had not been late that week were rated 100 per cent while those who had been late had their rating correspondingly reduced. Also, the company decided to pay those in the 100 per cent list full time for Saturday afternoon.

The first week not over two-thirds of the men reached the 100 per cent. Those who didn't had to take a good laugh from their fellows. We had one man who could neither read nor write, but even he soon learned where he stood. Every week that chart looked better, until, within a few months, we were having charts with all of the names in the 100 per cent class. Of course, every little while one or two would fall from grace, but things were going so nicely that they were not docked for the hour on Saturday afternoon.

—GEORGE B. JENNE.

*

Keeping Machines on the Job

I BELIEVE that there is a happy medium between the viewpoints of Al and Ed. Why should Pete, the repair man, be made the responsible party with respect to machine breakdowns or repairs?

In the first place, he does not know the ailments of the machine as well as the man who runs it, and, ordinarily, men are not slow to tell the foreman if the machine does not produce as it should. The foreman then will, of his own accord, shut the machine down for repairs. Then is when the maintenance man steps in. He should be able to use his own judgment as to what, and how much, repairing is necessary to put it in proper condition.

The maintenance man should make the rounds of all machines and give the proper attention to oiling and necessary adjustments to keep the machines in order. For, as it has been pointed out by leading industrial engineers, lubrication is the largest single factor entering into the upkeep of machine tools.

—H. F. FIEDLER, *Foreman, New Era Manufacturing Company.*

*

Old Kinks and New Ideas

TO THE workman whose heart is in his job, lectures and conventions, text books and technical articles are always of interest. The amount of knowledge gained, however, is an extremely varying quantity, chiefly because the average workman does not have the opportunity of trying out the information obtained. Often the points raised have no particular bearing on the listeners work, but an instinct urges the retention of the idea for possible future use. Too often, however, when the occasion which calls for this particular notion arises he finds his memory has failed him. After one very irritating incident of this kind, I commenced my own "reference library" consisting, in the first place, of an old loose leaf exercise book. In this I filed news cuttings, rough notes, programs, etc., in fact anything that appeared of interest to me. As my collection grew, I had a periodical revision, rejecting that which was out of date and indexing the remainder. Thus I now have a ready reference of innumerable "notions and gadgets" at my disposal.

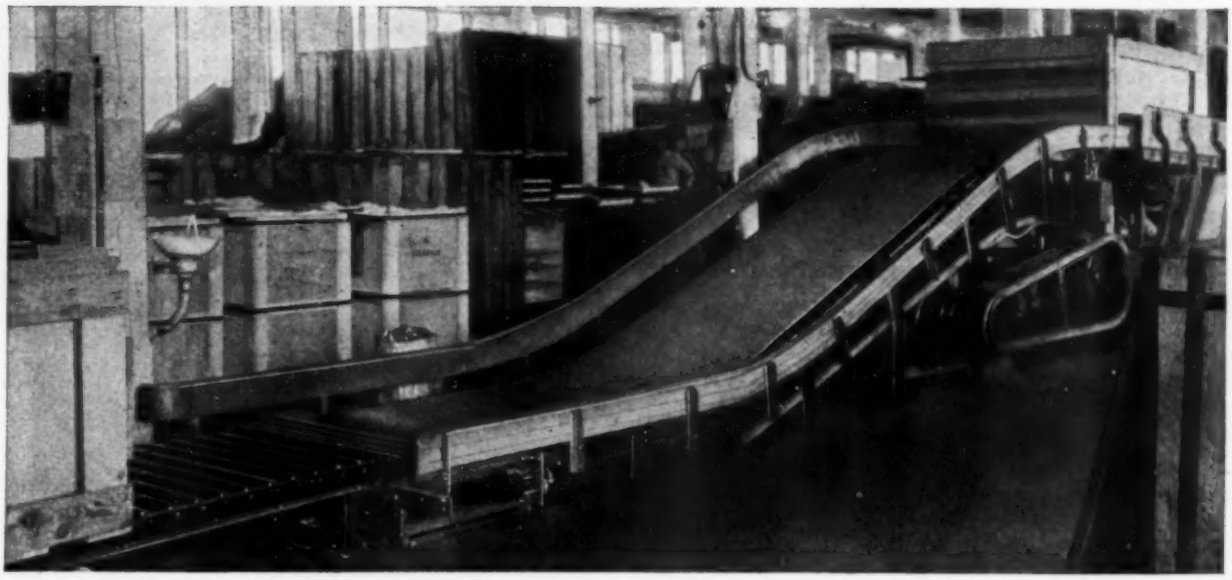
—LEONARD COOMBES, *Foreman, Warwick Time Stamp Company.*

* * * *

THE · NEXT · TOPIC

"Wrong Number"

Thirty-five Minutes Per Carload



Apron type conveyor at end of two-door assembly line

By R. H. HUCKE
General Electric Company

Limit switches and an almost human unloader put 400-lb. and 1,100-lb. cabinets on the cars rapidly and safely

LARGE packing cases or crates containing almost any product lend themselves exceptionally well to mechanical handling. The General Electric Company, at its Schenectady plant, has developed special equipment for conveying its refrigerators from the assembly line and packing room to the shipping cars. The most important unit in the system is an unloader which transfers the heavy crates from the conveyors to the cars. Similar equipment might be employed to advantage by other manufacturers who have corresponding problems in the handling and loading of large cases.

Throughout the production of the refrigerators, conveyor systems are used. One system unloads approximately nine car loads of insulating material from the cars each week and transfers it to the assembly lines or to storage. The steel for the box, and the finishing materials, are all handled by conveyors. An overhead chain conveyor carries the finished boxes through the finishing operations to the assembly line.

Assembly is in a straight line. On a moving slat conveyor, the product is completed and moved to a point where it is placed in the packing cases. When ready for shipment, these cases weigh anywhere from 400 to 1,100 pounds. Separate assembly lines are used for the single-door and the two-door cabinets.

At the beginning of the new shipping conveyor system, the two-door cabinets are received in crates, backs down, feet at right angles to the direction of travel. They are conveyed by roller gravity to an inclined booster apron-type conveyor and from that to a roller gravity conveyor.

The single-door cabinets are received in their crates, backs down, and feet in the direction of travel. By means of another apron-type conveyor these crates are brought to the same roller gravity conveyor as are the two-door cabinets. At this point the single-door cabinets are transferred from the apron conveyor to the gravity conveyor at right angles. The direction of travel is changed from longitudinal to transverse on the roller gravity conveyor by means of a series of power rollers set to control the direction of the cabinet until released to the gravity conveyor.

Both types of cabinets are now on the same gravity conveyor with their feet at right angles to the conveyor. All cabinets ride a 90-deg. roller curve through an opening in the wall onto an inclined, power, apron conveyor which lowers them to the power roller flight extending the full length of the shipping platform. The roller-flight type of conveyor was chosen because it gives ample storage for cabinets while the freight cars are shifted. Transportation of the cabinets is at the rate of about 7½ ft. per minute. The rollers can be used as a gravity roller conveyor in case of temporary power shut-off. In the event of a tie-up, the power conveyor continues to run, but the cases stand still; the rollers turn under them without harm. A force of approximately 14 lb. will hold a 400-lb. box from moving. These conditions are essential because produc-

tion must not be interrupted while freight cars are being shifted.

Two, power driven, semi-automatic, tilting devices, or unloaders, run on rails carried by the frame structure of the power chain conveyor. These unloaders remove the cabinets from the power, roller, flight conveyor and deliver them, feet down, to the floor of the freight-car. Each unloader is propelled along the roller chain conveyor through a rack and pinion by individual motor drives. These are manually operated so that accurate setting is obtained for unloading to the freight car door at any point along the siding.

There are two distinct operating parts of the unloader, the transfer arm, or kick-off, and the tilting mechanism. Each operating part is equipped with a separate motor and with suitable drives to get the required action for unloading.

SINCE the cabinets are of different widths, a special switch, called a selector, is used to divert the cases from the power chain conveyor at the correct time and place. If one switch were used, the cases might travel too far and not be deflected properly by the kick-off arm, or two boxes might be jammed by it. The selector consists of several contacts, one for each size of box. Each contact is connected to a limit switch mounted on the unloader frame and set to start the transfer arm at the proper time for each size of cabinet.

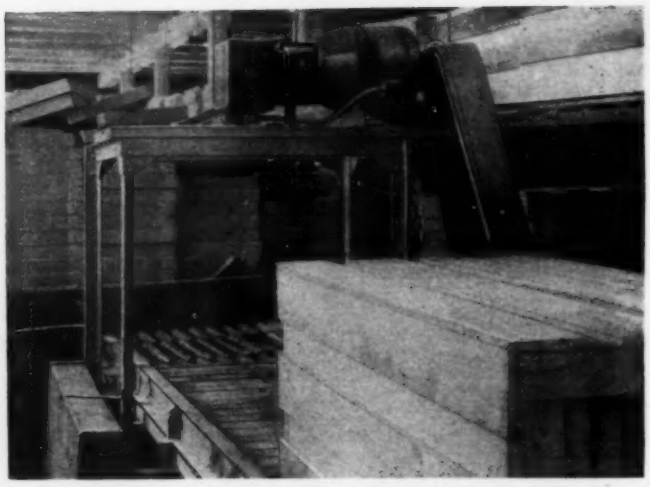
The transfer arm on the unloader is used to transfer the cabinet from the power roller chain conveyor to the tilting mechanism. Still on the power roller chain conveyor, with its feet pointing toward the freight car, the cabinet enters the unloader and engages the selector arm. This arm automatically sets the contact, or selects the limit switch which is to divert the case. When the case has thus set the selector and depressed the proper limit switch, the transfer arm motor starts and, in turn, through a crank and lever movement, diverts the cabinet from the power roller chain conveyor to the tilting mechanism.

When the transfer arm has reached the end of its outward stroke, it closes a limit switch that starts the motor operating the tilting mechanism table on its downward movement and also returns the transfer arm to the starting position. The tilting table is moved by a worm reducer, pinion, and gear segment that cause the table to describe an arc of approximately 90 deg. The cabinet is lowered to the freight car floor on its feet, is manually removed from the tilting table, and trucked to its position in the car.

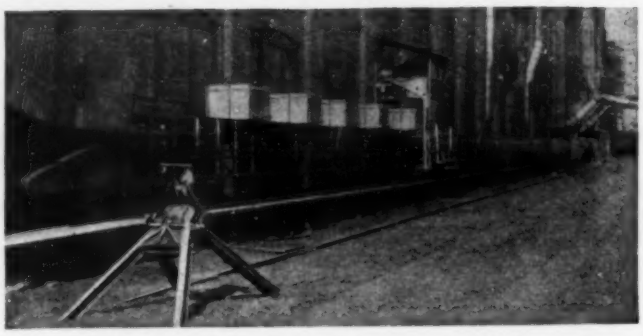
The tilting mechanism does not return to its loading position until the operator pushes a starting button. When the tilting table is down, the kick-off, or transfer-arm circuit is open, preventing jams that might occur if the kick-off mechanism were set in motion by a car accidentally pushed into the unloader. Should a case on the power roller chain conveyor be coming into the unloader while the table is down, it opens a limit switch which automatically stops the power roller chain conveyor. When the table is returned to its original position, the roller chain conveyor starts automatically.

A complete set of emergency buttons is also provided so that the unloader can be temporarily controlled in the event of a limit switch failure. Lights are mounted on the loading machine frame for illumination at night.

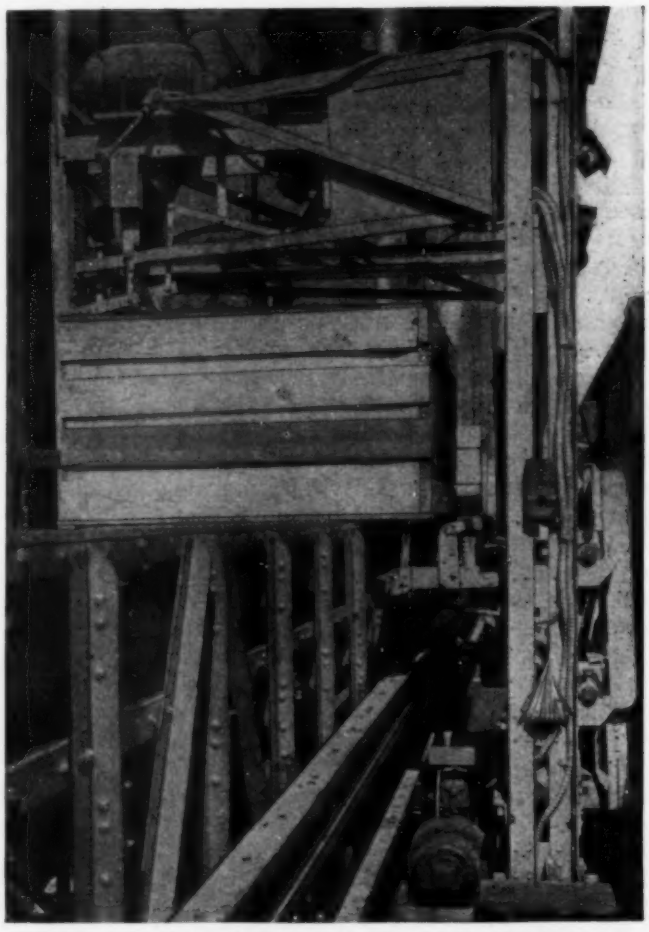
When it is desired to operate the two unloaders



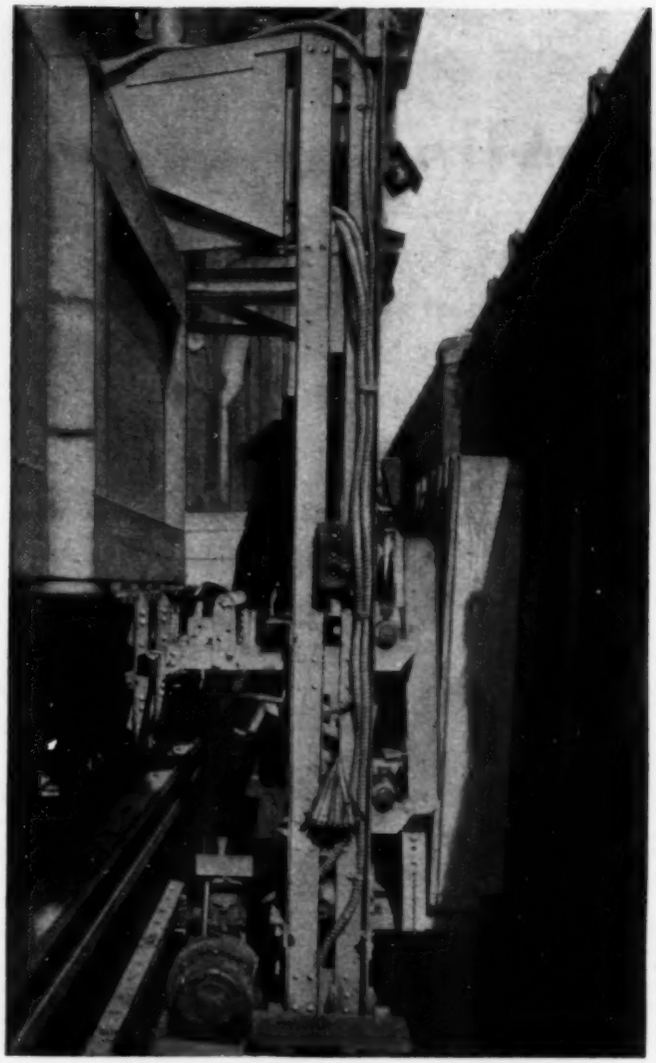
Transfer point at the end of assembly line



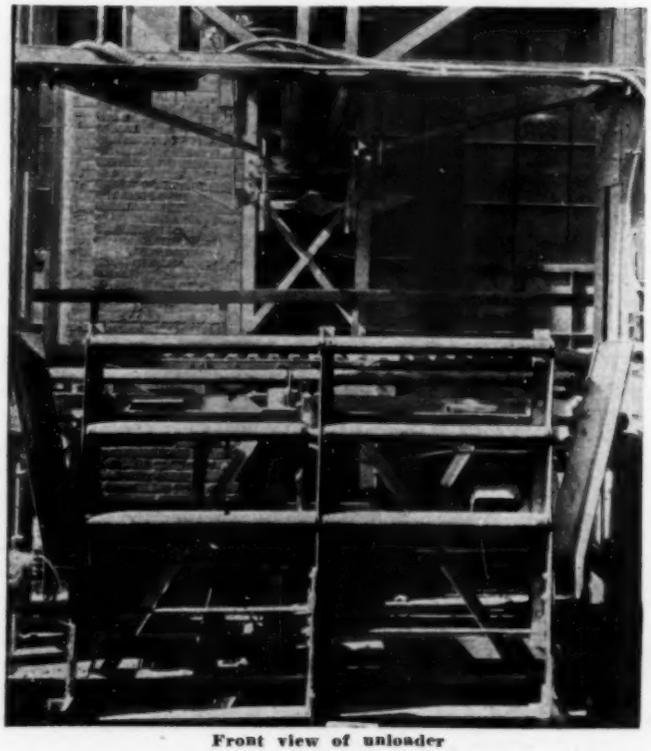
General view of shipping conveyor and platform



Side view showing a crate passing through the unloader



Cabinet delivered to freight car floor by unloader



Front view of unloader

simultaneously, the cabinets may be "by-passed" through one unloader to the other by throwing a switch. This is done when more than 50 cabinets per hour are being loaded.

Because of the efficient and almost human manner in which they accomplish their task, these unloaders are the main feature of the entire system. They were made possible by a series of specially designed selectors, limit switches, conductor rails, contacts, and motor controls, in combination with ingeniously applied mechanical movements. Each unloader is controlled by 10 limit switches, making a total of 20 for both.

With this system, a carload, consisting of 51 single-door cabinets, weighing approximately 400 lb. each, is delivered to the freight car in 35 min. This is about half the time formerly required to handle the same number of cabinets, and only about half the number of men were involved. The two-door cabinets, weighing 800 and 1,100 lb. respectively, are likewise handled with ease by the new system.

1930 Looks at 1880

By George Wilson
Newton, Iowa

ONE of the most pleasant experiences I have had in some time was the perusal of the 1880 copy of the *American Machinist* that was included with the April 3rd number. My shop experience dates back to about 1895, and I can remember with what pride the mechanical accomplishments of that day were considered and with what good-natured superiority we looked upon efforts of the early eighties and beyond.

Yet those old-timers who received this 1880 copy of *Machinist* read its pages, admired the progress in practice and design therein depicted, and, as we are doing today, tried to look ahead and get an idea of what the future held in store for the industry.

I have heard young fellows say, "If we had only lived then and could have looked ahead." And years hence men will look at the pages of the 1930 *Machinist* and say the same thing. Will the 1980 shop men look upon the magazines of today with the same good-natured tolerance with which we now look back at this old 1880 number and wish they had been here when our simple, crude contrivances offered such opportunity for achievement?

Still further food for thought is given when one reads the ads of this ancient milestone. Some there are who kept in the forefront of the procession and are still in the vanguard, blazing new paths for the feet of industry —Niles, Pond, Brown and Sharpe, Bradley, Hendey, Bliss, etc., are still names to conjure with and bid fair to go on and on into posterity.

So when the young men of today sigh for the chances of other days and bemoan a fate that brought them into a finished world, let them look over these old records and remember that other young men will come and look back to this day with the same regret.

Patents are funny animals. Here is patent No. 1,692,-240 issued some time ago, covering the use of "one minute Postum" as a brightener for cadium plating solutions. Why not a patent on double-spearmint chewing gum for plugging leaks in gasoline tanks?

Aluminum Alloys for Pistons and Cylinder Heads

By LIEUT. A. J. LYON
Air Corps, Wright Field

PISTONS of aluminum-copper alloy were used in Belgium and France in 1912, the copper content being 10 per cent. There are also alloys containing nickel, manganese, and magnesium.

Aircraft pistons are usually too complicated to be made in permanent molds, as are automobile pistons, although a metal mold and a sand core frequently give satisfaction. For cylinder heads, dry or green sand castings are used.

The Matériel Division at Wright Field has developed a series of alloys suitable for aircraft castings, some of which follow: An alloy containing 3 per cent copper, 0.5 magnesium, 0.3 silicon, and 1.2 iron gives 32,300 lbs. tensile, 3.2 per cent elongation, and a Brinell hardness of 74 with 500 kilograms for ten minutes. Heating the specimens to 977 deg. F. for five hours, quenching in cold water, and aging at 300 deg. F. for 24 hours, increased the tensile strength to 42,600. Adding from 0.25 to 0.50 nickel and increasing the silicon to 0.6 decreases the tensile strength slightly but increases the hardness a few numbers without affecting the elongation. Additional copper also increases the hardness slightly.

Two tables showing the effect of heat-treating aluminum alloys are presented. Table I gives the composition, strength, elongation, and Brinell of three alloys with different heat treatments. Table II shows how temperatures higher than 150 deg. C. require a much shorter time to produce maximum hardness and strength.

Table I—Stability of Physical Properties of Piston Alloys When Reheated

Heat Treatment	Tensile Strength Lb. per Sq.In.			Elongation, per Cent in 2 In.			Brinell Hardness 500 Kg., 10 mm.		
	X Alloy	Y Alloy	Lynite 122	X	Y	122	X	Y	122
Quenched.....	32,280	33,660	34,280	5.5	1.0	1.0	74	98	94
Quenched and aged.....	48,200	39,410	37,910	0.5	0.5	0.5	115	115	119
Reheated at 260° C., 1 hr.....	44,140	33,210	34,800	0.5	0.5	0.5	107	100	99
Reheated at 260° , 5 hr.....	38,120	35,920	28,960	0.5	0.5	0.5	100	92	89
Reheated at 260° ', 25 hr.....	32,530	29,810	25,300	2.0	0.5	0.5	74	83	77
Composition as mixed	Cu	Fe	Si	Ni	Mg	Al			
X	3.4	0.75	0.6	0.7	0.7	Dif.			
Y	4.0	0.5	0.3	2.0	1.5	Dif.			
Lynite 122.....	10.0	1.5	0.3	Nil.	0.25	Dif.			

The commercial casting alloys of aluminum increase permanently in size when in use. This permanent increase in dimensions is termed "growth," and its magnitude varies with the alloy and the temperature to which it is exposed in service. Growth of pistons has been attributed to stresses set up during the solidification and cooling of the casting, the growth ending with the machining operation. Annealing at 752 deg. F. has been recommended before the machining operation as a means of anticipating these stresses. No matter what method of cooling is used, the growth still occurs.

Table II—Effect of Temperature on Time Necessary for Aging

Aging Temperature, Deg. Cent.	Aging Time, Hr.	Tensile Strength, Lb. per Sq.In.	Elongation, Per Cent in 2 In.	Brinell Hardness
150	2	37,510	3.7	89
150	8	39,420	1.0	95
150	16	44,800	1.0	105
150	24	48,960	0.8	113
150	48	47,150	0.5	113
205	½	44,520	0.7	103
205	1	45,220	0.7	110
190	5	47,930	1.0	111
260	½	44,540	0.5	108

The Matériel Division laboratories have made growth measurements also. These studies show that X alloy and Lynite 122 suffer a slight contraction when quenched from elevated temperatures, while Y alloy shows a slight increase in volume.

After artificial aging or annealing at 374 deg. F. for 5 hours, all three of these alloys increase approximately 0.002 in. per inch after reheating to 500 deg. F. for five hours. Longer periods at this temperature produce no further change in alloys X and Y, but Lynite 122 showed a slight increase. This is in accordance with the density changes shown. It was shown further that continued exposure to a temperature of 500 deg. F. caused the alloys first to grow and then to shrink very slightly, which also is in accordance with the findings of the National Physical Laboratory (England). It is apparent that the growth of the aluminum casting alloys is very closely allied with their age-hardening characteristics and is due to the precipitation of the hardening constituents. From the practical standpoint, alloys aged to maximum hardness suffer little or no change in dimensions upon reheating, and short exposures to the upper limits of the age-hardening temperature range (300 to 500 deg. F.) are more effective in producing stability of dimensions than are longer periods at lower temperatures.

An abstract of a paper presented at the Fourth National Aeronautics meeting of the A.S.M.E., Dayton, Ohio, from May 19-22, 1930.

IDEAS FROM PRACTICAL MEN

The department, "IDEAS FROM PRACTICAL MEN," is devoted to the exchange of information on methods useful to the machinery industries. Its scope includes all divisions of the metal-working industry, from drafting room to shipping platform. Descriptions of methods or devices that have proved their value are carefully considered, and those published are paid for. The rates are from a minimum of five dollars upwards, depending upon their merit.

Puller for Gears and Couplings

BY H. J. BURNHAM
Birmingham, England

PRIMITIVE methods generally employed for removing gears, couplings, clutches, and the like from shafts are not objectionable if the operation has to take place at infrequent intervals only, but where they have to be removed once or twice a month, it is very important that the operation be managed without the deformation of any part. In addition, it is possible to save much time by standardizing the operation in so far as is possible.

A puller, the principles of which have been successfully applied in a number of devices for such work, is shown in Fig. 1. The hubs of the parts to be removed are drilled to a templet and tapped, and the puller is attached by studs, as shown. Pressure is applied by turning the hollow, internally-threaded screw *A* in the flanged nut *B*, using a tommy bar in the holes in the collar. A few sharp blows from a sledge on the ram *C* will then remove the most obstinate part in a very short time. Ample provision is made for lubricating the screw and the nut.

For parts having large bores, the parts *A* and *B*, respectively, are replaced by a hollow spindle that is free to slide, but not to turn, and a flange that has no thread. The part replacing *A* is buttress-threaded externally, and pressure is applied by a wormwheel nut operated by a worm, the shaft of which is carried in bearings mounted on the flange. The blows are given by a heavy battering ram suspended from overhead.

It is necessary to make provision for forcing parts on shafts, as the hubs are easily distorted by local or ill-directed blows. A pad secured to the hub of the part to be removed, as shown in Fig. 2, has been found very satisfactory and is particularly useful when the part has to be forced over a key. With practice, it is easy to swing a battering ram so that a heavy, axial blow is given on the center of the pad.

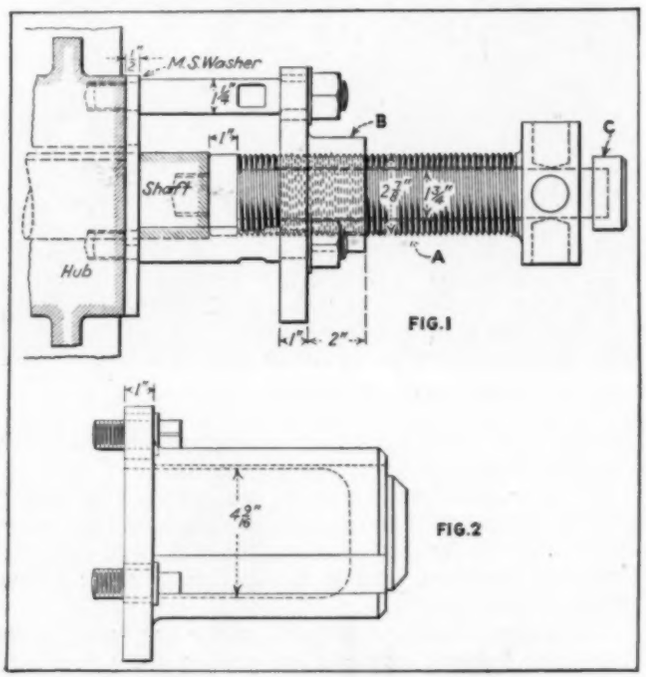
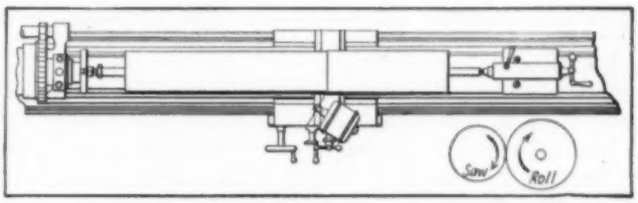


Fig. 1—Puller for removing parts from shafts.
Fig. 2—Pad used in forcing parts on shafts.

Truing Felt Rolls in the Lathe

BY W. B. LINCOLN, JR.
Chief Engineer, W. J. Savage Company

The success of a jobbing shop, in many instances, depends upon the ability of its personnel to solve unusual and difficult problems quickly, and at a low cost. Such a problem arose in one shop when it was given the job of truing a set of felt rolls used in a paper mill. The rolls were about fourteen inches in diameter and ten feet in length. They had been worn to such an extent it was necessary to remove as much as $\frac{3}{8}$ in. of material in some places to true them properly.



Set-up for truing felt rolls

It was found impossible to turn out a satisfactory job by the use of any conventional type of tool. After considerable experimenting, the following method was conceived and put into practice, the results being very satisfactory:

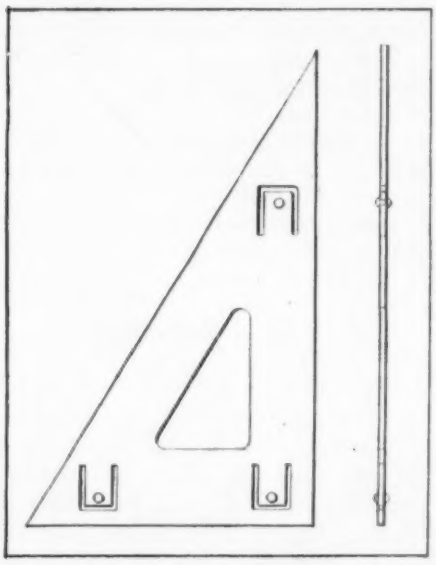
A 2-hp. motor having a speed of 1,800 r.p.m. was attached to an improvised base and then clamped to the base of the compound rest, as shown in the illustration. A 12-in. cross-cut saw was mounted on an adapter securely keyed and setscrewed to the armature shaft of the motor. The lathe and the motor were run in the same direction, so that the adjacent surfaces of the saw and the roll moved in opposite directions, as shown by the small diagram in the upper right-hand corner of the illustration. The saw was set to clean up all the low spots in one cut, and a fine power feed was used to

traverse the saw along the roll. The high speed of the saw, with its many cutting points, removed the high spots from the roll at a surprisingly-rapid rate, leaving the roll true and smooth. It was necessary to sharpen the saw after truing each roll, as the felt, in spite of its apparently soft texture, proved to be extremely abrasive.

Improvement in Draftsmen's Triangles

By G. A. Luers

Draftsmen's triangles have a tendency to smear the drawings as they are moved along the paper, due to the particles of pencil lead in the lines and on the paper. They also make a bad smear when moved over inked lines that are not wholly dry.



A triangle that will not smear the drawing

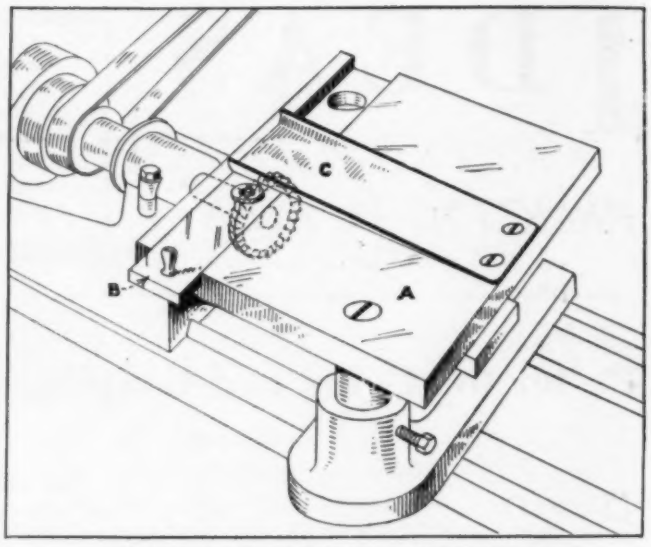
A triangle altered in accordance with the one shown in the illustration has the advantage of being a clean-working tool, causing little or no smearing. The alteration consists in making three U-shaped cuts, as shown, leaving short tongues. A rivet made from a brass escutcheon pin is placed in each tongue, near the end. With the rivets in place, the projecting heads constitute a three-point bearing and keep the triangle off the drawing, allowing it to slide freely. A slight pressure of the hand will spring the tongues and allow the triangle to be brought into close contact with the drawing.

A Slotting Fixture

By Charles H. Willey
Asst. Plant Supt., Hoyt Electrical Works

We have many jobs of slotting special types of round nuts, headless screws, and other parts used in our products. The slotting is done quite easily and cheaply on an attachment to a bench lathe, the arrangement being shown in the illustration. The table *A* is a plate of cold-rolled steel carried on an adjustable post. The work to be slotted is placed in a hole in the slide *B*, the wide, flat spring *C* applying pressure on the work, forcing it down upon the bottom of the groove in which the slide moves. The cutter, held on an arbor in the lathe spindle, is below the table. Pushing the slide inward carries the work over the cutter. After the slot has been milled, the motion of the slide is continued until the work drops through a hole in the table and through an inclined chute to a receptable.

Holes of different sizes in the slide, and different



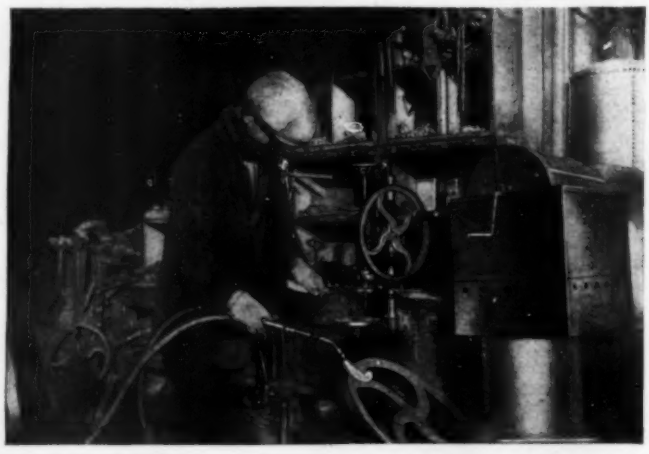
Slotting fixture attached to a bench lathe

slides, accommodate various kinds of work of short length. When the work is too high to allow the spring *C* to be used, it is held down by the operator's fingers. Since the cutter is below, there is no danger of injury to the operator. For slotting small work, we get very good results from the use of this fixture.

Oxyacetylene Welding in Korea

By Fred H. Colvin

Korea, or Chosen as it is now called, is neither a mechanical nor an industrial country; machine shops are few and far between. Machine equipment consists primarily of drilling machines, usually hand operated, and lathes of the same kind, although the latter are seldom



Welding a small flywheel in Korea

found. The drilling machine, a vise, and a few drills and files usually make up the equipment.

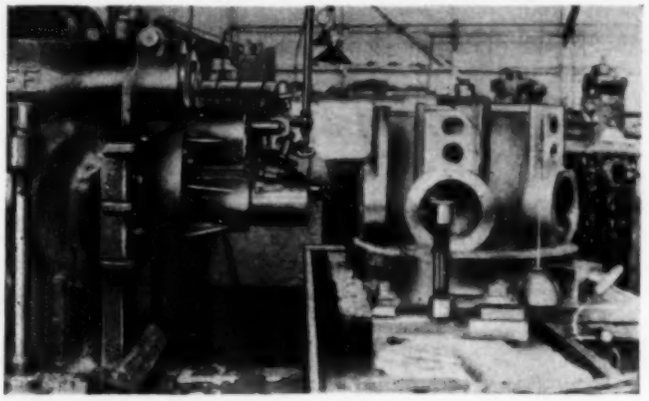
In the case shown, however, the enterprising young proprietor has added an oxyacetylene outfit and is repairing a cracked flywheel for one of the hand-operated threshing machines used to thresh rice or other grains grown in this vicinity.

The rotary roasting machine and the hot water tanks show that western methods are making their way into far countries, this shop being in Seoul, or Keijo, the capital city of Chosen.

Special Boring Head for Milling Machine

By Herbert F. Crawford

Among the operations on the crankcase of the Kinner airplane engine is the boring of three holes shown in the illustration. The large hole is for the projecting, or spigot, end of the cylinder, while the others are for the valve mechanism. These holes must be uniformly spaced and parallel on each face. As the production does not warrant a special machine, a three-spindle boring head



Three holes in an airplane crankcase are bored simultaneously

was built. This head clamps to the face and to the two overarms of a Milwaukee milling machine. The drive is taken from the spindle nose as is usual in such cases. Only two boring bars are shown in the illustration.

The large, lower bar bores the large hole and faces the outer surface for bolting the cylinder flange. The large bar also has a guide on the front end. This sort of boring head has the advantage of being very stiff and of holding the bars in alignment during the boring.

Press Tools for Ammeter Covers
Discussion

By Seth Fortune

Nottingham, England

The ammeter covers shown in an article by Charles H. Willey, under the title given above, on page 192, Vol. 72, of the *American Machinist*, could have been made in two operations instead of three, as shown. If the illustration is examined, it will be found that the flat recess is made larger in diameter in the second operation. The material for this enlarged diameter can come from the wall only, therefore the recess need not have been made in the first operation.

We used to make thousands of tins with spreading flanges, similar to the work illustrated by Mr. Willey. Our method was to bead the tins at the tops, and then to trap the flats, as shown at *C* in the last operation in Mr. Willey's illustration.

I bought a set of the *American Machinist's* books on machine-shop work, and in the volume on dies I found illustrations of tools for jobs similar to the ones we had in hand, but for making the recess in one operation. I made a set of the tools for our work, and found them to be O.K. Since then, whenever we had to make work with spreading flanges, we have made the tools as shown in the book, and they have worked successfully.

I am sorry I cannot give you the number of the page in the book in which the tools were illustrated, but my copy has been loaned to the teacher of evening classes in our trades school. However, I am sure the tools would be successful on the work shown by Mr. Willey.

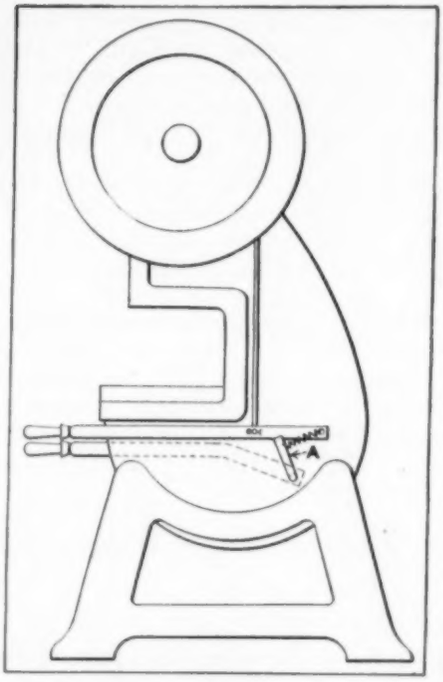
Safety Device for Presses

By David C. Bailey

Engineer, The Bailey Mfg. Company

The safety device shown in the illustration is in use on our punch presses where the nature of the work requires the operator to place both hands beneath the punches, either in placing or removing the work.

The treadle is removed and two levers are placed in such a way that the clutch cannot be engaged unless both levers are pressed down, either at practically the same time, or the one at the left first, one by each hand of the operator. The trip rod is attached to the lever at the right, one end of which is pivoted to the press frame. This lever is prevented from being pushed down by the piece *A*, the upper end of which engages in a notch in the lever and is held in place by a strong spring. The other end of the piece *A* is bent at a right angle and passes through the frame of the press. There it is fastened to the lever at the left. Pressing down the lever at the left withdraws the piece from the notch in the lever at the right, leaving the lever unobstructed, so that it can be pushed down, causing the engagement of the clutch, thus setting the press in motion.



Device to prevent accidental engagement of a press clutch

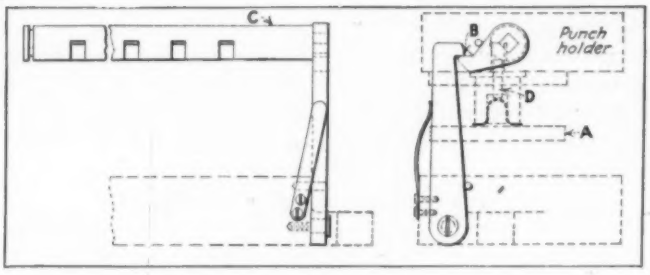
The outer ends of both levers are provided with file handles.

Positive Knock-Out for Progressive Dies

By Carl G. Forsman

When using an automatic feed on progressive dies, it is necessary to see that the stock does not double up, due to one or more of the shells sticking in the bushings. On some classes of work, spring knock-outs will prove satisfactory, though the breaking of a spring might cause trouble.

In the illustration is shown a simple and positive arrangement for operating a knock-out. It leaves the



A positive knock-out for a progressive die

stock lying flat on the pressure pad *A*, continuously. As the punch holder rises, the hooks on the levers engage, as at *B*, and at the same instant the pressure pad comes to a stop. As the punch holder continues to rise, the bar *C* is rotated a fraction of a turn by the short lever attached to its end, causing downward movement of the knock-out pins *D*. On the downward stroke of the ram, the knock-out pins return the short lever to its former position as the shells are being drawn.

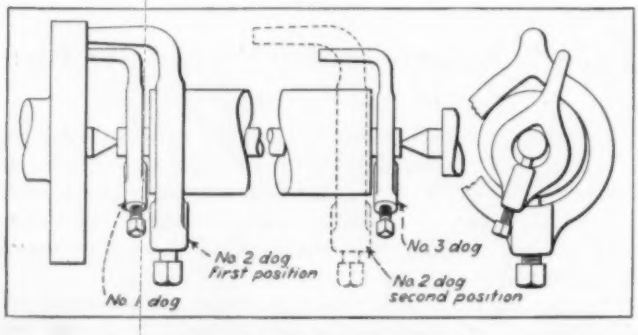
The bar *C* is notched with an end mill that is slightly larger in diameter than that of the knock-out pins, and the outer corners of the notches are rounded to a radius of $\frac{1}{16}$ in., to ride easily on the tops of the knock-out pins. There are as many notches in the bar and as many knock-out pins as there are stations in the die. A dog-pointed screw in the punch holder engages the circular groove in the end of the bar and prevents end motion. The diameter of the bar is 1 in., it being a running fit in a reamed hole in the punch holder. The flat spring at the left of the long lever has a very slight movement, the amount depending upon the length of travel of the knock-out pin.

Driving Work by Three Dogs

By Harry Moore

Hamilton, Ontario, Canada

Recently, we had to make a dozen cast-iron rolls. They were to be 12 in. long, 6 in. in diameter, and to have a 1-in. hole, finished sizes. It was impossible to take a decent cut on the outside, no matter how tightly the mandrel was driven into the hole, because the friction between the mandrel and the hole was not sufficient to prevent the work from slipping under pressure of the cut. Therefore, we drove the work by means of a dog clamped on the outer diameter, using the mandrel simply as a support between centers. The rolls could not be turned for their full lengths without turning them end for end; an awkward procedure, as they were pretty heavy. After having to turn a couple of the rolls end for end, it occurred to us that it would be a good plan to use another dog, so that the rolls could be driven from the tailstock end while the portions nearest the headstock were being turned.



How the dogs were applied

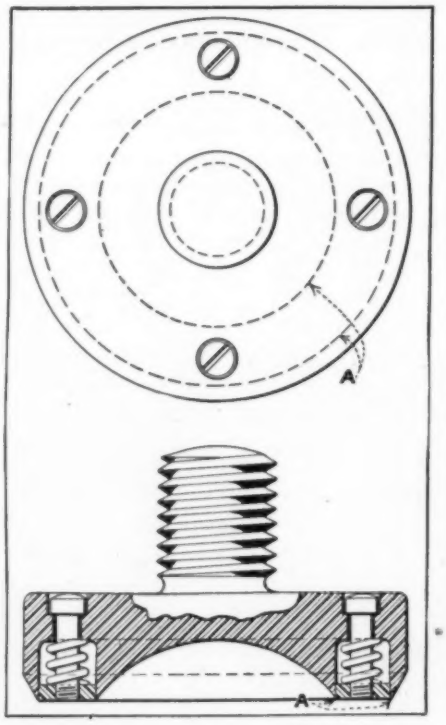
The mode of procedure was to use dog No. 1 on the mandrel, next to the faceplate, and dog. No. 2 on the work itself, to drive it while turning the part nearest the tailstock. When that part of the work had been turned, dog. No. 2 was moved to the opposite end of the work, and dog No. 3 (which hung on the tailstock center when not needed) was slid onto the mandrel and tightened, to drive dog No. 2 and therefore the work. The illustration shows the scheme.

Punch for Cloth-Inserted Packing Rings

By Charles C. Tomney

Tool Designer, Brunswick-Kroeschell Company

We use quantities of rubber packing rings with cloth insertions in the stuffing boxes of our compressors. The rings were formerly cut out by a washer cutter in a drill press, but the combination of the cloth, the rubber, and the high speed at which the cutter was necessarily run, soon dulled the cutter, giving us all kinds of trouble. It was quite a job to set the cutter properly after grinding it, as we hold the inner and outer diameters of the rings to quite close limits.



Dinking punch for cutting out packing rings

Finally, it was decided to make the dinking punch shown in the illustration. One of the advantages of a punch of this kind is that it does not lose its size in grinding. The body is of tool steel and has a threaded shank to fit the ram of the foot press in which the work is done. The circular stripper is backed up by four coil springs, being held in place by screws. The cutting edges *A* stood up remarkably well, and needed touching up about three times only in punching 15,000 rings. The punch has now been in use for more than three years.

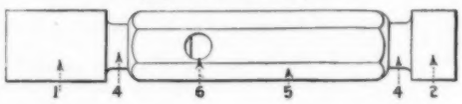
In cutting the rings, the stock is backed up by a hardwood block, with which the cutting edges of the punch come in contact at the end of the stroke, as is customary in the use of punches of this type.

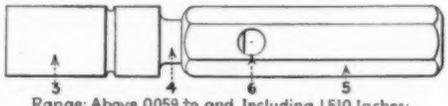
Set-up bolts having worn threads or rounded nuts should be discarded because they permit wrenches to slip.

American Gage Design Standards

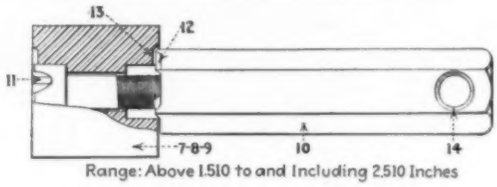
Commercial Standard as of July 1, 1930

PLAIN CYLINDRICAL PLUG GAGES
(Construction Details)

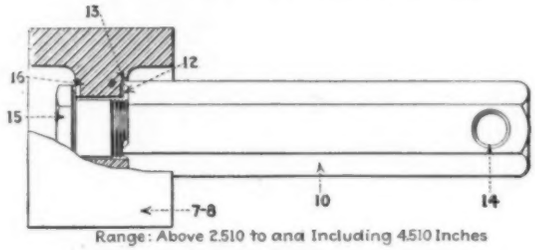




Range: Above 0.059 to and Including 1.510 Inches; Optional Above 1.510 to and Including 2.510 Inches

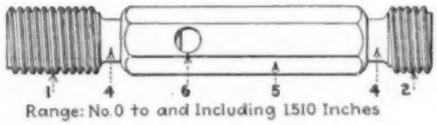


Range: Above 1.510 to and Including 2.510 Inches

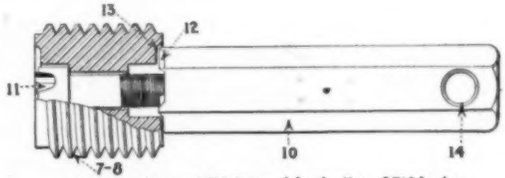


Range: Above 2.510 to and Including 4.510 Inches

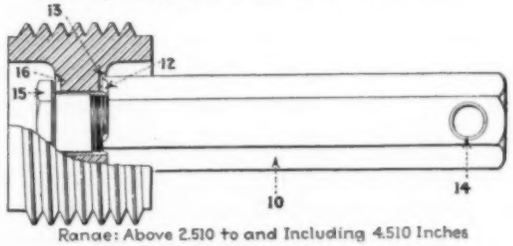
THREAD PLUG GAGES
(Construction Details)



Range: No. 0 to and Including 1.510 Inches



Range: Above 1.510 to and Including 2.510 Inches

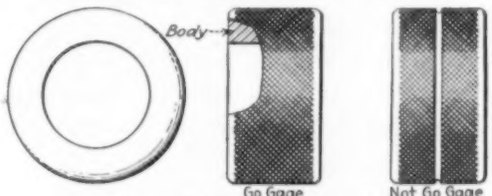


Range: Above 2.510 to and Including 4.510 Inches

1 "Go" gaging member
2 "Not go" gaging member
3 Progressive gaging member
4 Shank
5 Taper lock handle
6 Drift hole (or slot)
7 "Go" gaging member
8 "Not go" gaging member
9 Progressive gaging member
10 Handle for reversible gage
11 Socket head screw
12 Locking prong
13 Locking groove
14 Crosspin hole
15 Hexagon head
16 Web

PLAIN RING GAGES
(Construction Details)

Range: Above 0.059 to and Including 0.510 Inch



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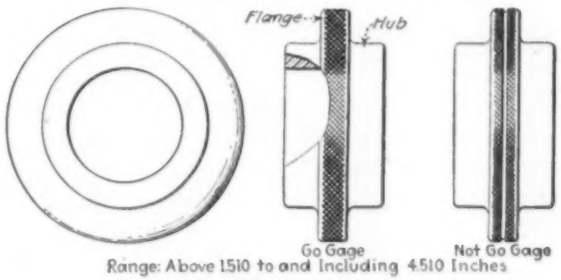
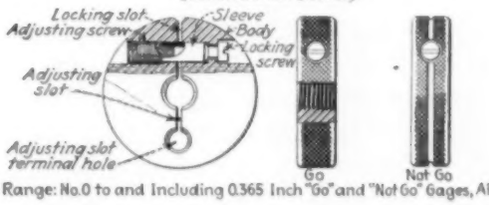
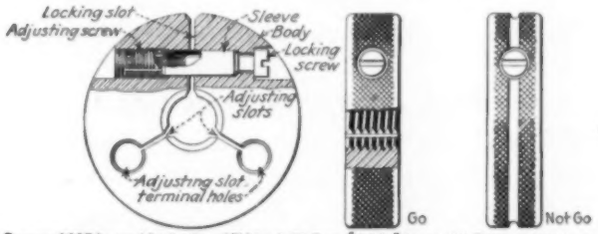


Range: Above 1.510 to and Including 4.510 Inches

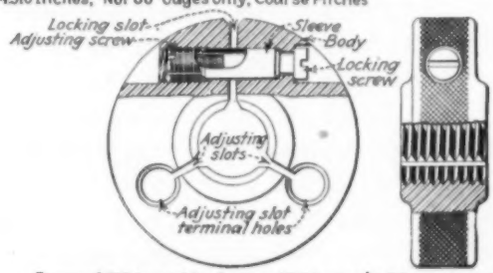
THREAD RING GAGES
(Construction Details)



Range: No. 0 to and Including 0.365 Inch "Go" and "Not Go" Gages, All Pitches



Range: 0.365 to and Including 0.510 Inch, "Go" and Not Go" Gages, All Pitches; 0.510 to and Including 4.510 Inches, "Go" and "Not Go" Gages, Fine Pitches; 0.510 to and Including 4.510 Inches, "Not Go" Gages Only, Coarse Pitches



Range: 0.510 to and Including 4.510 Inches, "Go" Gages Only, Coarse Pitches

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American Machinist

Editors: KENNETH H. CONDIT AND FRED H. COLVIN

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A Management Tool

MICROMOTION study is many years old in principle, yet the instances of successful applications are relatively few. The road of the motion study pioneers was exceedingly stony, but there is promise of better days ahead.

The General Electric Company has been training its job analysts in motion study methods for about three years, and results of their work are beginning to be apparent. Now the automobile time study group in Detroit has awakened to the possibilities of micromotion study as an analytical management tool of great accuracy, and has started with its usual thoroughness to apply it.

Before long we shall be hearing from these men that jig and fixture designers are not making adequate provision for efficient motions by the machine operators, and that production equipment designers are turning out machines that cannot be operated efficiently. Then we shall have long and acrimonious arguments.

Would it not be wise for the machine and tool designers to familiarize themselves with, and apply, micromotion fundamentals before the job analysts really hit their stride? Much discussion would be avoided and a lot of sales resistance would be broken down.

*

Balancing Cutting-Tool Costs

IS LONGER life or higher cutting speed the more desirable in a cutting tool? Advocates of both sides can put up strong arguments, but which side is right? Or is either right enough to justify a hard and fast rule for general guidance?

Consider a machine for which the setting of the tools after grinding requires an appreciable amount of time. Is it better to run the machine at the highest possible speed, even with tungsten carbide tools, and so secure a maximum product while the machine runs, or to run at such a speed that the tools can be ground or changed at stated periods that will interfere least with production.

When tools are ground they must be reset in the machine or in the toolholder. With this resetting of tools goes the possibility of error in adjustment and its effect on the accuracy of the work. Two points must then be considered—machine time lost while changing or grinding tools, and work spoiled because of incorrect resetting of tools. As in most cases, good management must balance one factor against another. Machine overhead and spoiled work must be balanced against higher output while the machine is in operation.

It will probably be found economical, in many shops, to run machines at speeds that will give a continuous output over a given period, rather than to run to the limit of the new tools. The period may be a half day or a week, perhaps more. But such a plan will give a constant check on costs, conserve the machine equipment, and enable those who cannot throw out all present-day machines to use them to best advantage until they can be replaced.

Cutting speeds are likely to increase; it is folly to be content with what we have. But speed is not the only consideration. It is the *net cost* when all factors are carefully weighed that tells the story of real economy.

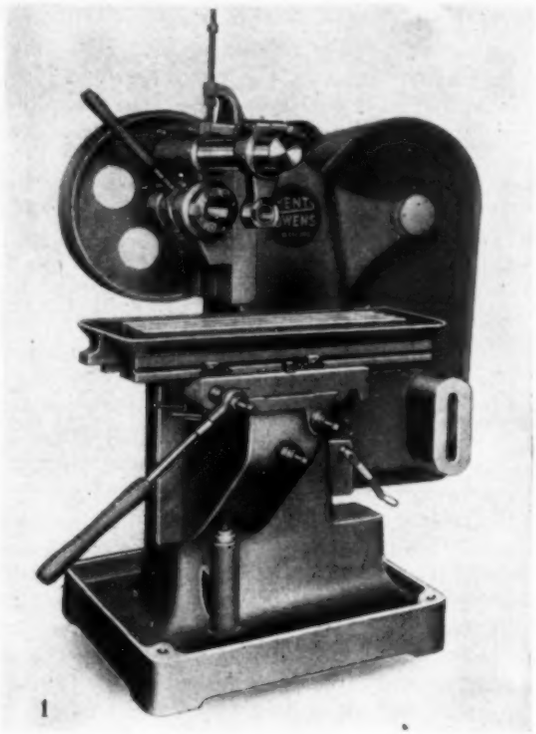
*

Another Regional Council

SIGNIFICANT of the rapid growth of manufacturing in the states south of the Mason and Dixon Line and east of the Mississippi River is a recent meeting of a group of prominent citizens of these states which resulted in a decision to call a regional conference in October to consider civic and industrial problems of that section of the country. The accomplishments of the New England Council in promoting the interests of the New England States are sufficient proof of the soundness of the regional council principle, if any proof of the soundness of well-considered cooperative action be necessary. Suspected of dry rot a few years ago, New England is now admired for her progressive spirit.

The governing body will be known as the Southeastern Regional Council. Its efforts should be watched closely by everyone in the metal working industries, because they may well lead to the opening up of new markets, to the establishment of new industries, and to new opportunities for existing industries.

SHOP EQUIPMENT NEWS



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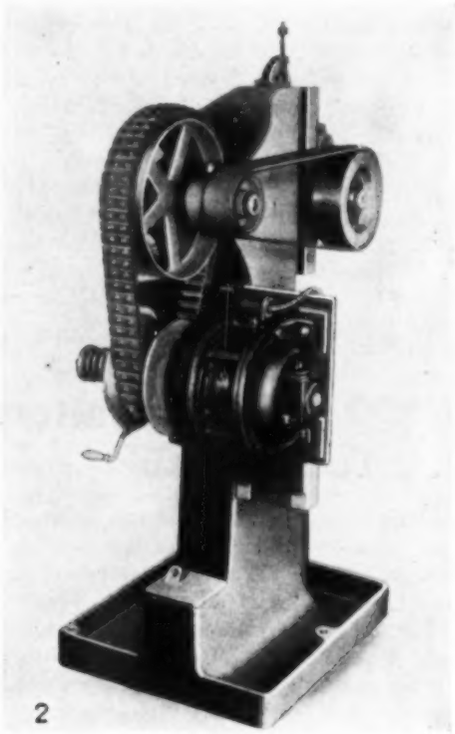


2

Increased range and greater rigidity are results of the changes made on the Kent-Owens Nos. 1 and 2 Heavy-Duty Milling Machines, of which the No. 2 unit is shown in Fig. 1. Variable-speed drive at the rear of the machine, as shown in the right hand figure, provides any speed in a 3 to 1 ratio

Kent-Owens Improved Nos. 1 and 2 Heavy-Duty Milling Machines

INCORPORATION of variable-speed drive is one of the improvements made on the Nos. 1 and 2 heavy-duty millers built by the Kent-Owens Machine Company, Toledo, Ohio. This variable-speed drive provides an infinite number of spindle speeds over a wide range and makes the machines suitable for both small lot and production work. The machines may be shifted from one job to another, their wide range of speeds and small weight being of value when this is desired.

The No. 1 machine has been increased in range, and changes have been made to improve convenience of operation and rigidity. The head slide is now longer, increasing the maximum distance from the top of the table to the center line of the spindle to 16¼ in., and permitting the spindle center to be brought down to the same height as the table top. Also the saddle has been lengthened, making the table slideway long, thus improving its accuracy, life, and ease of operation. Improved handles are used for locking the saddle to the knee and the knee to the column. The knee is now a box-type casting with a solid top and closed front, greatly increasing the strength and rigidity of this member.

The No. 1 milling machine has a table working surface 22 in. long by 5 in. wide, and the head can be fed vertically by means of the hand lever through a distance of 6½ in. Cross saddle adjustment of 5 in. and table travel of 17 in. are other movements. Any spindle speed desired ranging from 120 to 1,200 r.p.m. (with a 1,200 r.p.m. motor) can be obtained. This range is covered without steps, the operator selecting the exact speed best suited for the job. This is effected through the variable-speed transmission at the rear of the machine as shown in Fig. 2.

The larger No. 2 heavy-duty miller, as shown in Fig. 1, now has an idler upon the spindle drive belt, thus keeping this belt under proper tension and insuring ample pulling power for all positions of the head. The table is 28 in. long by 7 in. wide. The maximum distance from spindle to table is 17⅛ in., and the head can be fed vertically 6½ in. by means of the hand lever. Cross saddle adjustment is 7 in. and the total table travel is 22 in. The spindle speed range is from 100 to 1,200 r.p.m., using a 1,200 r.p.m. motor. Other ranges are obtained in proportion to the speed of the motor.

The variable-speed drive is clearly shown in Fig. 2. The drive from the motor to the backshaft is through a combination flat and V-belt. This belt rides upon its angular edges between two cone disks upon the motor shaft and upon its inside face over a plain pulley upon the backshaft. The cone disks upon the motor shaft are continually pressed toward each other by a coil spring, thus forcing the belt to the greatest diameter. The belt

used is of heavy endless construction, made of woven cord vulcanized in rubber. To change speeds, the motor carrying the cone pulley upon its shaft is simply moved toward or away from the backshaft. As the motor approaches the backshaft and their center distance becomes less, the spring forces the V-belt toward the outer circumference of the cone, which operates the spindle at high speed. Similarly, moving the motor away from the backshaft causes the V-belt to ride upon a small diameter of the cone, thus decreasing the spindle speed. A spindle speed variation of 3 to 1 is obtained by this adjustment, and it is increased to 10 to 1 by interchanging the pulleys on the spindle and backshaft.

Speed changes are made directly at the front of the machine by simply turning the handle shown at the lower part of the guard. Turning this handle causes the motor slide to move toward and away from the backshaft as described above. It is apparent that any desired speed within the range provided can be obtained quickly. There are an infinite number of speeds available, there being no steps. The operator can hence select exactly the speed known to be most desirable for the job.

Foster No. 2-F Duplex "Fastermatic" Turret Lathe

TO TAKE advantage of short cuts in machining through the simultaneous performance of a sequence of operations, a duplex turret lathe, known as the No. 2-F duplex "Fastermatic," has been developed by the Foster Machine Company, Elkhart, Ind. This machine will perform boring, facing, chamfering, and turning operations simultaneously from two directions in the bore of wheels for agricultural machinery and other products. This work is chucked on a head mounted at the middle of the machine, where it is possible to bring two sets of tools, carried by turrets, into simultaneous engagement with opposite sides of the work. The work is finished in a single setting, and thus both accuracy of alignment and saving in manufacturing time are accomplished.

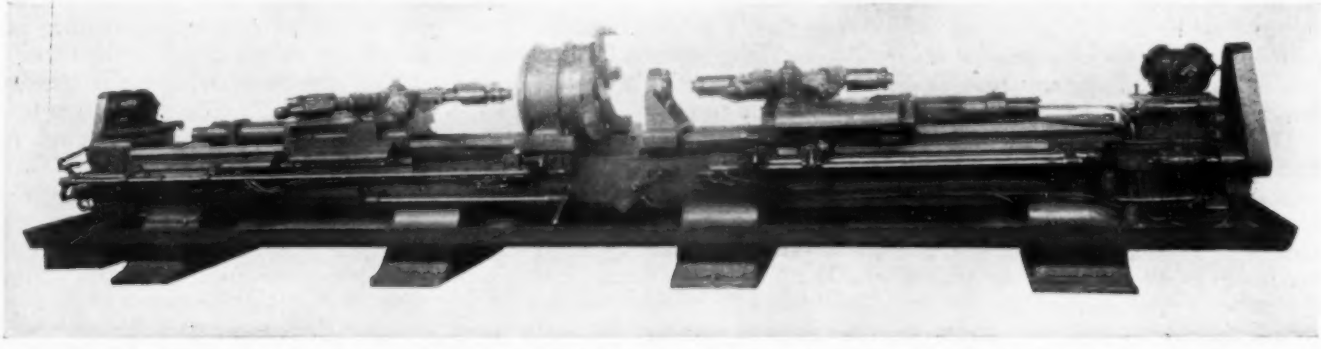
Essentially, the No. 2-F "Fastermatic" consists of two sets of standard turrets, mounted at either side of the special head, so that they may simultaneously engage the work from both sides. The sequence of operations to be performed at either side of the bore consists of facing the outside of the hub, boring the cavity, and facing a flange at the inner end of the bore on each side of the hub. This work is divided up into rough boring and facing, finish boring, facing, and chamfering, and a final reaming operation. There are three steps in the cycle, and following the usual Foster principle of tooling in such cases, each turret is equipped with two sets of three tools each. By this means it is unnecessary to index the turret back to the starting position, because after it has reached the third step, the next index of the turret provides for bringing the next set of roughing tools into position.

The machine is run automatically, a series of cams providing for rapid advance of the tools to the work, then changing to the required feed movement, withdrawing the tools, and indexing the turret to the next station, after which the movements are repeated. At the conclusion of the cycle, the machine is stripped automatically to a neutral position, and after the finished piece has been removed from the chuck and the new part inserted, the cycle is started again by lifting a control lever at either side of the head.

An electric motor is mounted on each end of the machine and a third motor at the back. The last provides means for driving the workhead, which is equipped with sliding gears. These gears permit obtaining either of two selective rates of speed. As the machine is a single-purpose manufacturing unit, these change gears would not be required were it not for the fact that it is necessary to provide means of obtaining a slower operating speed should the castings to be machined prove unusually hard.

All of the feed and rapid traverse movements of the turrets and tools are accomplished hydraulically. The feed movements are secured through an Oilgear unit, and the rapid traverse movements by means of an oil pump. Control of these units to secure the required movements is accomplished by means of cams, as previously mentioned.

In setting up a job or through some abnormal condition arising, it may be necessary to operate the turret movements by hand. This can be effected by throwing the control lever to the neutral position, after which the various feed, traverse, and index movements of the turrets can be made by shifting the control lever by hand to the various positions on a



Hydraulic operation is featured on this Foster No. 2-F Duplex "Fastermatic" Turret Lathe, which employs two turrets feeding from opposite directions for double-end work

graduated dial. This lever is moved automatically to the various positions when the machine is under automatic control.

A safety device is placed in each turret, which makes it impossible for either tool to be fed into contact with the work, unless the turret has been indexed to the proper position and the turret locking bolt properly seated. This is accomplished by means of a stop on the turret slide, which is interconnected with the turret locking mechanism in such a way that the stop arrests forward movement of the turret beyond the desired point. Further, when the machine is under hand control for setting up a job, the turret may be partly withdrawn and then indexed by hand to bring any set of tools into line with the work. The locking bolt does not drop into place unless the turret is withdrawn all the way ready to start on its next movement.

It is claimed by the manufacturer that any experienced screw machine or turret lathe operator can handle the No. 2-F "Fastermatic" efficiently on those classes of double-end work for which a duplex machine is adapted. On the job shown, the hub bore is machined in cast steel. The diameter is 3 in., minus two to three thousandths, and the length of the cut is 2 5/16 in. On this job the floor-to-floor time for machining both sides of the bore is 2 minutes.

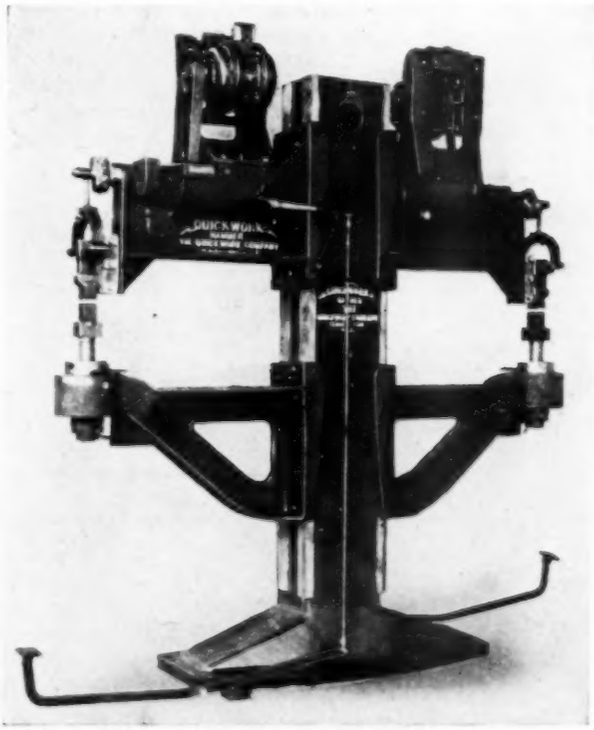
"Quickwork" Twin Power Hammer

INTENSITY of the blow on the "Quickwork" twin power hammer can be increased or decreased in direct proportion to the amount of pressure exerted by the operator's foot on the pedal without changing the number of blows struck per minute. This feature enables the operator to adjust himself to a certain speed of passing the metal under the die with a certain sway of his body and permits striking the first roughing blows as well as the last blows without throwing him off his "stride." Because of this feature a larger production can be obtained.

The "Quickwork" hammer is made in only one size by the "Quickwork" Company, St. Mary's, Ohio. The weight of the unit is 6,130 lb. Direct-connected motor drive is supplied. One 2-hp. motor is mounted sturdily on each arm. The belt drive from the motor has a cushioning effect, and is therefore used instead of direct gear drive.

Because of the construction of the lower die support, the lower die can be adjusted quickly upward or downward in relation to the upper die, it being only necessary to loosen the large jam nut at the lower end of the anvil screw supporting the die and insert a piece of cold rolled steel in the pilot holes. Turning this member adjusts the lower die downward or upward. The anvil screw on which the die is mounted is so keyed that it cannot turn with the member.

One of the features of this twin power hammer is the fact that it occupies only 7 ft. by 2 ft. 3 in. of floor space, and can be quickly moved about without any changes of production floor plan. The center column is machined on both the surfaces to which the power hammers are mounted, as well as the sides of the column. The hammer brackets have large flanges, insuring alignment of the hammer dies throughout the life of the unit. Between the bracket and center column is placed a $\frac{1}{4}$-in. thick piece of leather so that vibrations are not transmitted through the column to annoy the operator on the opposite side of the hammer. As the center column is machined for its full length, the brackets can be raised or lowered or spaced differently as the work requires. The machine is sturdily built throughout.



"Quickwork" Twin Power Hammer on which the intensity of blows struck can be modified by pedal pressure without changing the number of strokes per minute

"Duronze" Silicon-Bronze Alloy

Better machinability and strength can be obtained in "Duronze" silicon-bronze alloy than in phosphor-bronze. This material is a product of the Bridgeport Brass Company, Bridgeport, Conn. In the annealed condition, the alloy has a strength of 42,000 lb. per sq.in., but develops a strength of approximately 130,000 lb. per sq.in. when severely cold drawn. The cold drawing process, however, does not make the alloy brittle as is characteristic of hard worked brass and nickel silver.

As stated above, "Duronze" can be machined more readily than phosphor bronze and much more easily than most acid resisting alloys. It does not wear cutting tools excessively. In threading, tools such as are designed for copper are suitable for "Duronze," and for stamping, forming or drawing, the same layout for tools as is designed on brass will work with equal satisfaction. Furthermore, it is claimed to be uniform and dependable in physical properties. The material does not stiffen up as quickly as phosphor bronze in cold working. Nevertheless, it can be often used in place of phosphor bronze for certain types of springs. It is claimed to offer equal or even greater resistance to abrasion than phosphor bronze and also greater resistance to fatigue.

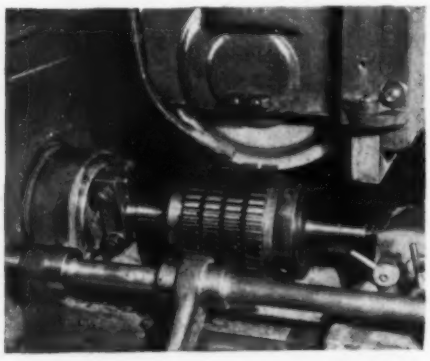
"Duronze" can be welded, soldered,

buffed, plated, and machined. It is available in sheet, strip, rod and wire. As mentioned, the physical properties vary with the amount of cold working. Tensile strength for ¼-in. rod is 90,000 lb. per sq.in., whereas in the 1-in. rod it is 75,00 lb. per sq.in., and in the 2-in. rod, 70,000 lb. per sq.inch.

Pratt & Whitney 9-Inch Hydraulic Gear Grinder

THE Pratt & Whitney Company, Hartford, Conn., has purchased all the patents and manufacturing rights for the Garrison gear grinder from the Garrison Gear Grinder Company, Dayton, Ohio. Henceforth, this machine will be known as the "Pratt & Whitney" 9-in. hydraulic gear grinder.

This gear grinder is claimed to provide a very fast and accurate method of finishing gear teeth to close limits by generation and is economical for standard manufacturing. It is also of use for salvaging gears.

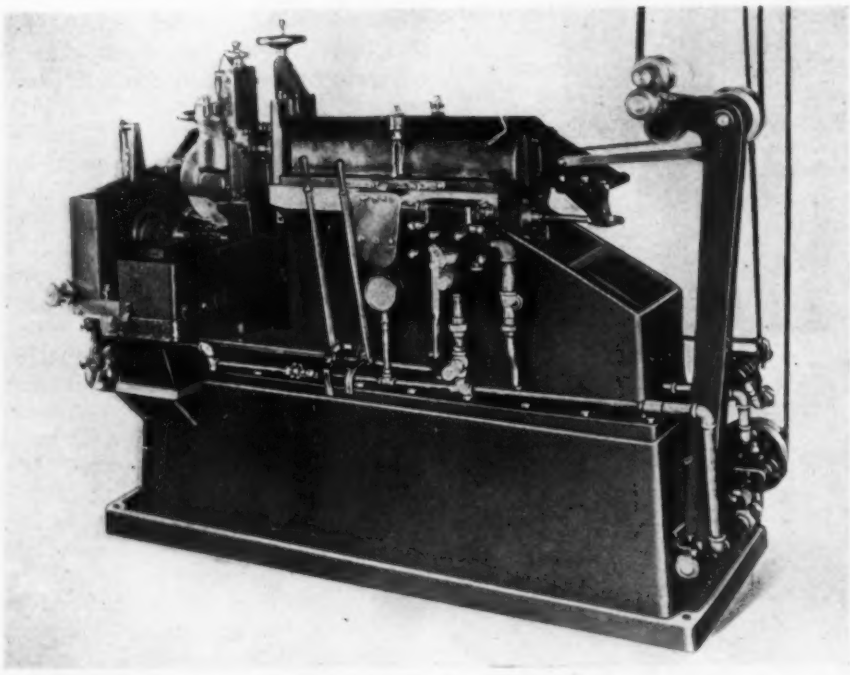


Showing how the wheel is traversed over a cluster of gears

The operation of the machine is simple. A reciprocating horizontal ram, similar to that of a horizontal shaper, carries the grinding wheel back and forth through the teeth, grinding adjacent sides of two teeth at once. The wheel is trued up with straight sides corresponding to the shape of a master rack. The gears being ground are rolled past the wheel under the guidance of a master gear and rack, so that the wheel engages the work in exactly the same manner that a tooth of the master rack engages the master gear. As many passes per tooth as are necessary are given for the finish required. When the work has moved to the opposite end of the wheel and out of engagment with it, the rack is lifted out of the master gear, the latter indexed one tooth, and the rack reengaged automatically. When the work has been indexed one complete revolution, the machine stops automatically.

Wheel dressing is accomplished by a built-in device which passes a diamond along both sides and top of the wheel, producing the correct angles. The wheel is always kept in the same position relative to the work regardless of wheel truing.

Hydraulic operation of the ram and feed are provided, which does away with reversing shocks and produces smooth, positive drive. This is adjustable easily by a valve to any speed within its range. In general construction the machine is compact and rigid and has broad wearing surfaces.



Pratt & Whitney 9-Inch Hydraulic Gear Grinder, formerly the Garrison Gear Grinder. Hydraulic operation provides smooth drive

"Timesaver" Lapping Compounds

Several lapping compounds under the name of "Timesaver" are being marketed by the Abrasive Engineering Laboratories, Inc., 117 No. Jefferson St., Chicago, Ill. It is claimed that the materials break down from an abrasive to a very fine polish and they will not imbed in any metal surfaces. They may be used for fitting either new or reconditioned bearings and produce smooth open-pored surfaces which retain the oil film. It is claimed that the lapped bearings are superior to scraped bearings, since they are the same as "broken-in" bearings and have uniform oil clearance. No further running-in time is necessary as there are no high spots to be worn down, thus saving labor, time, and expense.

The No. 60 compound is used for babbitt and similar soft bearing metals, the No. 80 for bronze, and the No. 111 for cast-iron. Compounds are mixed with ordinary machine oil to the consistency of a thick paint for medium size bearings and a thin paint for large size bearings, using a medium grade machine oil in both cases.

"Timesaver" is easy to use and rapid in finishing, cutting at first and gradually reducing to a smooth polishing agent, leaving the metal surfaces in a smooth lapped condition. The open-pored velvet-like finish produced retains the oil so that it in-

sures perfect lubrication under all conditions. The surfaces are free from abrasives or metal flaws. There is no scraping, tearing, or dragging of overlapped metal into the bearing surface. These features make the material suitable for finishing of valve seats, gears, cylinder walls, lathe or planer ways, bearings, general machine tool production, maintenance, and similar work.

"Timesaver" compounds are manufactured for soft metals and in a range for hard metals. They are packed in 1½ oz., 3 oz., and 1, 5, 10, 25, and 50 lb. containers.

Acme Special-Drive "Duo Control" Turret Lathe for Tungsten Carbide

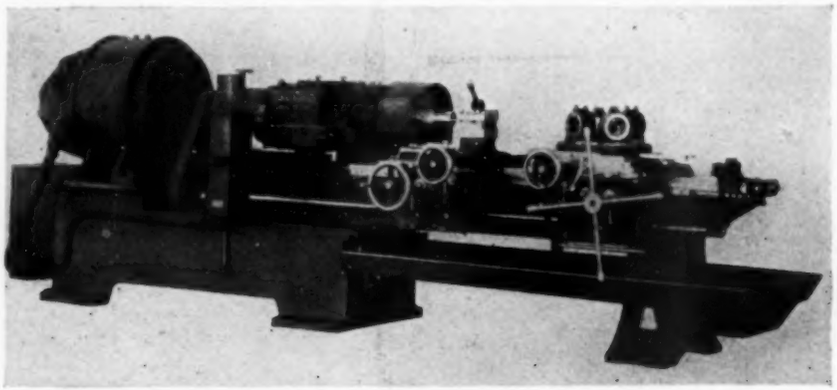
A SPECIAL drive has been fitted to the "Duo Control" turret lathe by The Acme Machine Tool Company, Cincinnati, Ohio, in order to make use of tungsten-carbide cutting tools in machining phosphor-bronze bearings. A 25-hp. adjustable-speed motor is connected direct to the spindle by means of a flexible coupling. Spindle speeds from 300 to 1,200 r.p.m. are available and are adjusted by means of rheostats, one of which is equipped with a vernier for the finer adjustments. Starting, stopping, and braking are all controlled electrically.

The spindle is fitted with the standard Acme roller-bearing construction, having a double set of Timken bearings on the nose with a floating rear roller bearing. A positive lubricating system is supplied for the spindle bearings. This lubricant passes through a Purolator after being pumped by an oil pump driven by a constant speed motor, which also drives the turret quick motion.

Twelve independent reversible feed changes are provided for each carriage, all of which are located in their respective aprons. The feed changes are made by means of sliding gears mounted on squared shafts, which, in turn, revolve in anti-friction bearings. The mechanism revolves in an oil bath.

The main carriage can be furnished with either fixed center or cross-sliding turret, either of the hexagon or flat type as required. Power rapid traverse is also incorporated for longitudinal movement of this unit.

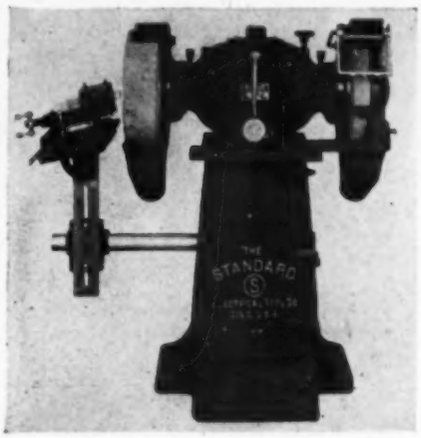
The square turret carriage is rigidly mounted on both front and rear V's of the bed, offering a firm support for the tooling. Regular engine-lathe taper and chasing attachments can be furnished.



A 25-hp., adjustable-speed motor is connected by a flexible coupling to the spindle of the Acme "Duo Control" Turret Lathe equipped with special drive for using tungsten carbide on machining of phosphor-bronze bearings

"Standard" Tungsten-Carbide Grinder

Reconditioning tungsten-carbide tool bits is the function of the direct motor-driven grinder developed by the Standard Electrical Tool Company, Cincinnati, Ohio. The toolbit holder holds the tool rigid with set-screws in a radial member, which has forward micrometer adjustment by means of a screw and ball crank. The radial member is graduated at the base to insure precision in grinding to various angles. The rake is adjusted by means of a 90-deg. graduated slot in the base of the attachment. Vertical movement is obtained by sliding the entire attachment in the long slot in the vertical member, and horizontal adjustment is made by sliding the knuckle joint on the bar to compensate for wear of the wheel. The toolholder is moved by hand across the face of the wheel, but the travel is controlled by a slot in the base.



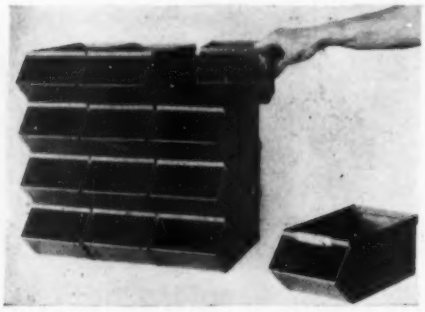
The angle, rake, and cut required on tungsten-carbide toolbits can be set on the "Standard" Grinder before moving the tool across the wheel by hand

The angle, rake, and cut can be set before grinding, which prevents unnecessary tool waste. The machine is powered by a 3-hp. motor. The heavy nickel-steel spindle runs on SKF ball bearings. It is equipped with a magnetic starter and push-button control, and can be arranged for installing a coarse wheel for rough grinding on one side and a fine wheel for finishing on the other side.

The wheels employed are 14x4x1½ in. face, cup type. The height of machine from floor to center of spindle is 37 in., and the total weight is approximately 800 pounds.

Simplex Nesting Bins

Material handling costs can be reduced in three ways by the use of "Simplex" nesting bins manufactured by the Simplex Tool Company,



Simplex Nesting Bins are of use in assembly lines, in the toolroom or stock room, and in layout work

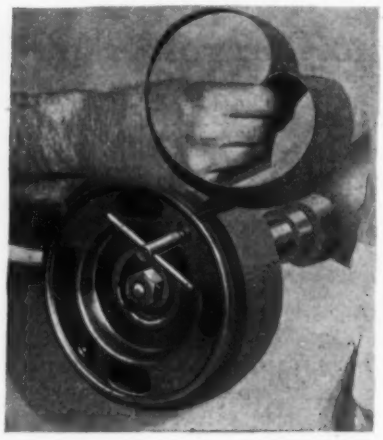
Woonsocket, R. I. The bins save time in assembling of small parts; reduce handling time on production work, and eliminate counting in inventory work. They are made in three sizes as follows: 4 in. high x 5½ in. wide x 10 in. long, 5¼x7½x 12½ in., and 6½x9x15 inches.

In assembling small parts, these bins place many different parts easily within the reach of men. Parts stacked one on top of another are readily accessible as compared with pans spread out along the bench. Twenty "Simplex" bins take bench space of 10x22 in., as compared with 20x56 in. required for open pans of the same size. Furthermore, parts in process may be carried along in the "Simplex" bins, and the stacking of one bin on top of the other conserves space and keeps more work ahead of the machine operator where a conveyor system is used, and also saves time in handling by truck. The contents are always visible and empty bins can be picked out readily.

The bins are also of use in stock rooms or tool cribs where they may be stacked in any order desired. For inventory purposes they eliminate the necessity of counting the parts, as the entire contents can be weighed to get the quantity. For laying-out work in toolmaking, jig, fixture, and die parts may be kept together in individual bins. Job numbers may be shown on card holders. Simplex bins will not unstack.

"Quick-As-Wink" Rubber-Cushioned Buffing Wheel

Rubber-cushioned abrasive wheels made in 6-, 8-, and 12-in. diameters have been placed on the market by C. B. Hunt & Son, Salem, Ohio. These wheels are claimed to give clean smooth buffing action with a full width of face on either stationary or flexible shaft buffers. Abrasive cloth of any grade, from 24 to 180 grain, can be used, and the application of a new band is done easily without removing the wheel from the spindle. Strips of abrasive cloth may



Applying abrasive strip to "Quick-As-Wink" Rubber-Cushioned Buffing Wheel

be attached with or without metal end clips. A slight turn of the wrench tightens the strip on the wheel and revolving the wheel causes a slight expansion of the rubber cushion, so that the abrasive cloth hugs the entire surface tightly.

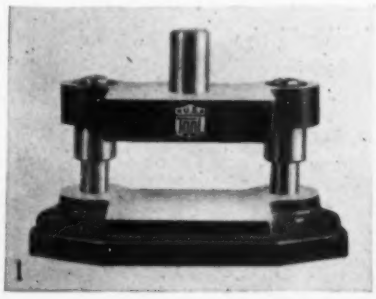
"U. S." Standardized Die Sets

Heavier construction, longer leader pin bearings, and actual rated die space are among the features of the line of standardized die sets built by the U. S. Tool Company, Ampere, N. J. Both the die shoes and punch holders have been made heavier to assure alignment and long service. The leader pin bearings are about twice as long as formerly. Reference to Fig. 3 at *A* will show that positive lubrication on bushed sets is afforded by the annular space between the two bushings. The leader pins operate in a full bath of lubricant and the bearing surface is not diminished. Unbushed sets have the leader pin bearing surfaces finished by the "Presglaze" process, which gives a hard glass-like surface similar to that obtained on running in cast-iron bearings. These unbushed sets are intended for operations requiring only commercial accuracy on average runs, and are economical in use.

Die sets selected by the rated capacity will actually take dies of the same dimensions, and no allowance need be deducted for the bushing thicknesses. Furthermore, the leader pin bosses are placed at the corners of the rectangular die space and do not hinder stock as it is fed in either direction.

Several different styles of die sets are manufactured, both in the bushed and unbushed models. Style A is a general purpose die set. Above 8x10-in. die space, the leader pins remain fixed to prevent deflection and the die shoes are extended.

The design is for progressive die work in combination with gang dies, and the thickness of the die shoe insures proper strength for compound dies. Style D is for requirements of blanking die work where strip stock is used. The diagonal location of leader pins insures balance and rigidity. General-purpose die work on a straight-side press is taken care of by Style M, and Style L is similar with the exception that provision is made for the use of a floating swivel adapter. Circular work may be done on the Style J of general-purpose



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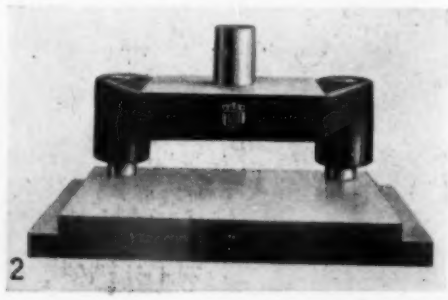

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"U. S." Standardized Style B Die Set intended particularly for foot and small power presses. It is suitable for light work requiring accuracy. Fig. 2—Style S.O. Die Set with a steel base for heavy-duty work on steel stampings

type. Both leader pins set in the rear. Style K is intended for round blanking work from strip stock.

The Style B die set, illustrated in Fig. 1, is for foot and small power presses and has a minimum working shut height of 4 in., particularly suitable for light work requiring precision accuracy. Other sets made with steel bases are available in Styles S

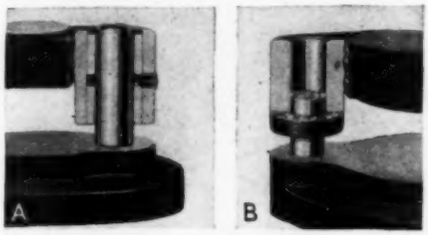


Fig. 3—At *A* is shown an annular space for lubricating the leader pins, whereas at *D* is shown the construction of unbushed sets having the "Presglaze" finish on leader pin bearing surfaces

and S.O. The latter is illustrated in Fig. 2. Both of these sets are designed for heavy duty die work on steel stampings, the only difference being in the location of the leader pins. Styles F and P die sets are arranged for square and circular work, respectively, on commercial work, and are not provided with leader pins.

Mohr & Federstaff Portable Brinell Hardness Tester

A portable Brinell hardness tester weighing approximately 22 lb. is being marketed by the Industrial Apparatus & Instrument Company, 239 Springfield Ave., Newark, N. J.

Mohr & Federstaff Hardness Tester specially adapted for car wheels

This instrument is manufactured in Germany by Mohr & Federstaff, and is particularly useful on testing heavy or inaccessible parts, wheels and axles, finished machinery and parts, and may be operated by one man. The tester consists of a yoke of steel for receiving and measuring the forces exerted and a load producer, which can be adjusted to act in opposite directions. Thus specimens may be tested on both internal and external surfaces.

The center part of the body which receives the loads is in the form of easily bent tension and compression struts, which undergo a comparatively large elastic deformation in the direction of the height when the instrument is under load. The alteration of the height of the vertex is transmitted to the precision measuring dial, which is connected with the struts, and forms a measure for the load applied. The testing pressure is produced by turning a crank handle provided with a suitable backgear.

The hardness tester is fastened upon the test piece in the manner of an ordinary screw clamp by means of an adjustable screw spindle. After turning the load producer through 180 deg. in such a manner that the ball points toward the outside, parts can also be tested outside of the yoke.

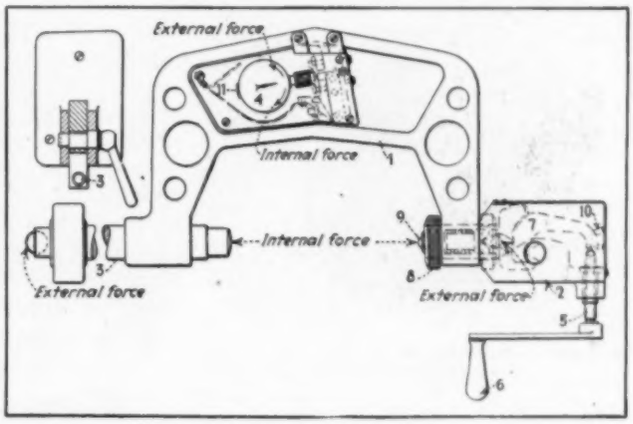
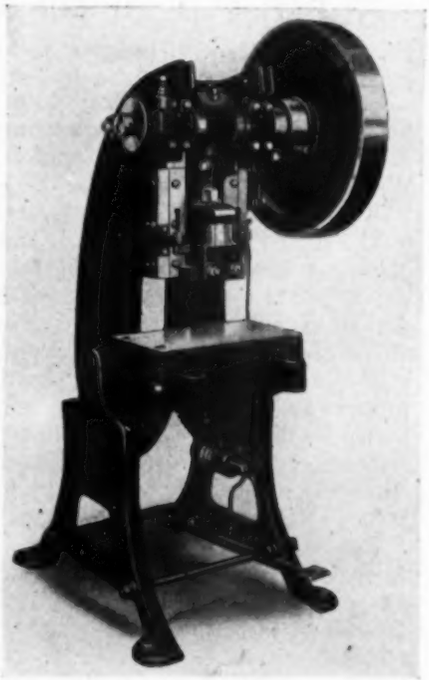


Diagram of Mohr & Federstaff PZ-3 Portable Brinell Hardness Tester, showing how elastic deformation of the two struts is made use of by the dial gage as a measure of the load applied to the specimen

Loshbough-Jordan No. 3 Open-Back Inclinable Press

An open-back inclinable press with a capacity of 22 tons and a special 8¾-in. die space has been developed by the Loshbough-Jordan Tool & Machine Company, corner of Renn St. & Sterling Ave., Elkhart, Ind. This press has a standard 2½ in. stroke, adjustment up, stroke down to the top of the bolster plate. With additional die space, this small press can be used on deep drawing jobs. The press has a toggle control and a tripping latch, which makes a positive lock until the operator deliberately trips the press. Further, a safety stop is provided to prevent the clutch pin engaging the flywheel. This feature is used when setting dies or while the wheel is in motion.



Loshbough-Jordan No. 3 Open-Back Inclinable Press, which has a capacity of 22 tons and a die space of 8¾ inches

"Profilo" Ball Files

Rotary files with generated helical flutes have been placed on the market by the Rotary File Company, care of The Equipment Company,

"Profilo" Mill-Cut Rotary Ball File with generated helical flutes

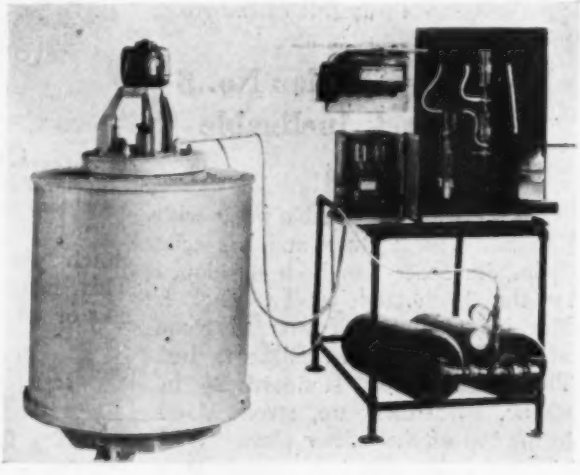
6351 Brush St., Detroit, Mich. These files are claimed to be accurate because of the generated form, and give smooth surface finish through the spiral flutes. They have standard clearance and are manufactured in various sizes.

Hevi Duty Type MU-500-N Nitriding Furnace

For production of limited quantities, the Hevi Duty Electric Company, 4100 Highland Ave., Milwaukee, Wis., has developed the Type MU-500-N small nitriding electric furnace of the forced circulation type. This furnace follows closely in design the largest production furnaces in that it consists essentially of the usual type of pit furnace, inclosing an alloy retort, bolted and sealed to the furnace proper. A centrifugal fan is supported by the cover for the rapid circulation of the gases in the furnace. Ammonia is introduced to the charge through the cover.

Like the production furnaces, this type of furnace permits charging the work to be nitrided in an alloy basket 8 in. in diameter by 20 in. deep. The basket is placed in a retort, which is then gassed to exhaust all of the air and placed in the furnace, already up to temperature. Upon conclusion of the nitriding cycle, the retort is removed from the furnace and the ammonia flow is continued through the work while cooling down. Another charged retort can then be placed in the furnace without interruption of heating.

This type of furnace permits a practically continuous use of the furnace without long delays and interruptions to the heating cycle caused by the cooling down and gassing operations. The furnace has an electrical input of 3.5 kw. at 220 or 110 volts with automatic temperature control.



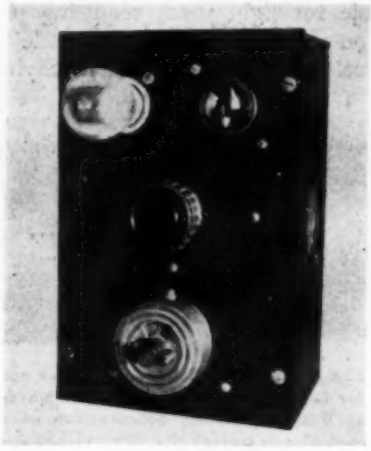
Continuous nitriding of small production lots can be undertaken on the Hevi Duty Type MU-500-N Nitriding Furnace

"Clarostat" Electric-Soldering-Iron Heat Controller

A device that maintains proper heat on electric soldering irons has been developed by the Clarostat Manufacturing Company, Inc., 285 N. Sixth St., Brooklyn, N. Y. The device is in the form of a metal box with a front panel carrying a pilot light, a receptable to take a soldering iron plug, a heat control knob, and a three-position snap switch. The box is provided with knockouts to take BX or conduit wiring.

To operate this device, the snap switch is turned to the first position, applying full line voltage on the soldering iron, thereby obtaining prompt heating. After the iron is hot, the switch is snapped to the second position, and the heat control knob regulated, obtaining the desired operating heat. The third position turns off the current.

It is claimed the life of the average soldering iron is extended at least three times by the use of carefully controlled heat. Also, the tip remains clean and ready for instant use, as contrasted with the pitted and corroded tip encountered when excessive heat is generated. Furthermore, in delicate soldering operations the heat may be precisely regulated, since a separate resistance is employed.



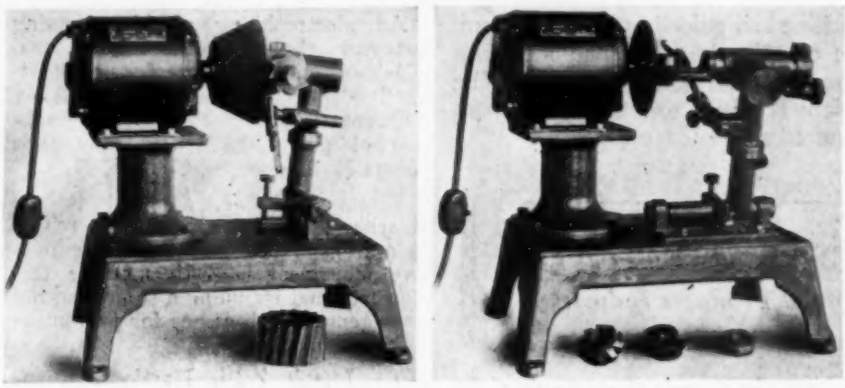
Increased life of the average electric soldering iron can be obtained by the use of a "Clarostat" Heat Controller

Wells No. 30 Cutter Sharpener

Straight- and spiral-flute milling cutters, side mills, milling cutters, counterbores, and circular form tools can be sharpened correctly on the No. 30 cutter sharpener announced by the Wells Manufacturing Company, P. O. Box 613, Greenfield, Mass. A saucer wheel is furnished to sharpen formed cutters and form tools, but for all other types of cutters a cup wheel is employed for grinding a flat relief, in place of the usual concave relief. This flat relief gives a better cutting edge, which will last longer and run with less chatter.

The outside diameter of all regular milling cutters is ground by sliding the cutters along a bar, past the wheel. The cutting edge is guided by a tooth rest in the correct position. End mills are held in a sliding collet bar and slid past the wheel in the same way. The swivel head of the machine can be adjusted to suit any angle cutter.

The swivel head swings on two pivots, which are adjustable for wear.

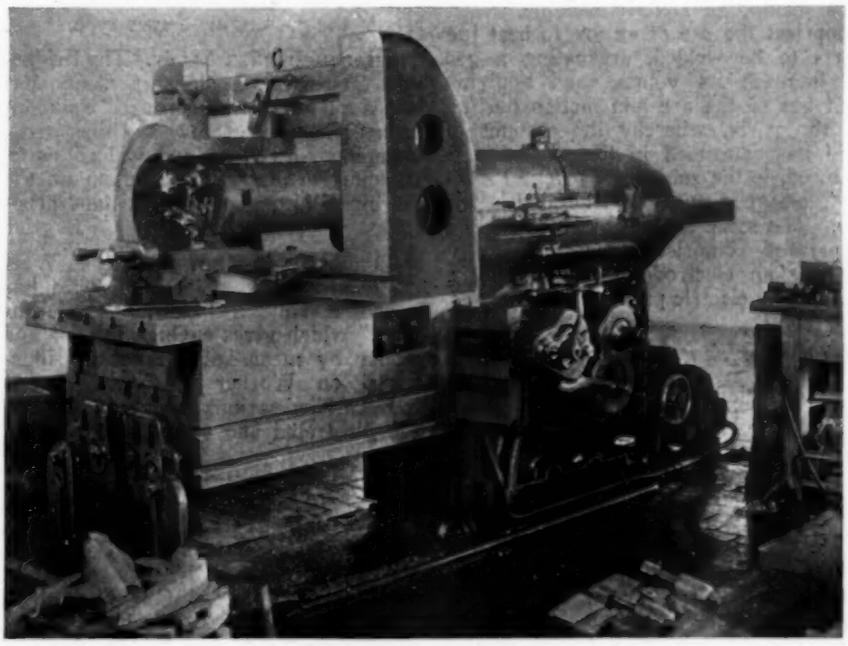


Left—Grinding the relief on a milling cutter on the Wells No. 30 Cutter Sharpener. Right—By a simple relocation of the work support, the cutting edges of hobs and form tools may be sharpened

There are no slides or gibs to become worn. All adjustments are simply and easily made. The wheels are mounted directly on the motor shaft and can be readily changed or replaced. The $\frac{1}{6}$-hp. motor is furnished with switch and cord ready to plug into a convenient light socket. Weight of the machine is 75 lb., and the bench space required is 14x17 in. Any standard voltage motor can be employed.

Ohio "Super-Dreadnaught" 36-Inch Railroad Shaper

QUICK and easy repairs of locomotive parts are facilitated by the 36-in. "Super-Dreadnaught" shaper distributed by Joseph T. Ryerson & Son, Inc., 16th and Rockwell Sts., Chicago, Ill. The machine is manufactured by the Ohio Machine Tool Company, Kenton, Ohio. A special extension head is used with either the single or double driving box attachment for machining the crown brass fit and cellar seat of any driving box. Other attachments adapting this tool to locomotive repair work include: a fixture for the shoe and wedge fit; rod brass attachment; shell or crown brass attachment; shoe and wedge chuck; crossheads; and a fixture for machining electric locomotive driving wheel boxes.



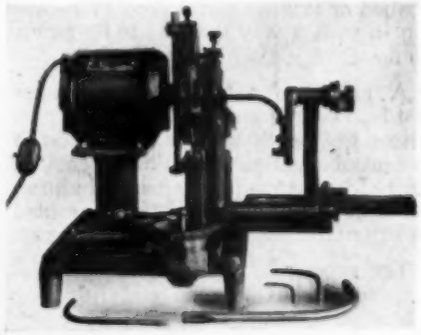
Ohio 36-Inch "Super-Dreadnaught" Shaper with special extension head and either a single or double driving box attachment for machining the crown brass fit and cellar seat

The 36-in. "Super-Dreadnaught" shaper is built exceptionally heavy and is thoroughly ribbed to give unusual strength to the bull gear hub and to the rail and ram bearings. The ram and rail bearings are large, eliminating any possibility of chatter or vibration on the heavy cuts encountered on driving box work. Square ram bearings are used, and they are fitted with three-piece adjustable gibs, providing equalization for wear. A heavy rail with a wide table support equipped with a special adjustable table jack preserves alignment to the table.

All control leavers are grouped within a radius of 12 in., and are easily reached from the operator's position at the side of the machine. Lubrication is furnished by an automatic force-feed system.

Wells No. 14 Bent Tap Sharpener

Because of their awkward shape, it is almost impossible to grind bent shank tapper taps free-hand so that they will cut efficiently. But by the use of a No. 14 bent tap sharpener, announced by the Wells Manufacturing Company, P. O. Box 613, Greenfield, Mass., it is claimed that as good results can be obtained with bent taps as with straight taps. This grinder will grind a tap with the



Bent shank tapper tap being sharpened on the Wells No. 14 Sharpening Machine

correct eccentric relief, so that each tooth will do its share of cutting. The machine does not depend on the skill of the operator for accurate work. The tap is gripped in the machine and guided by the relief cam. It's capacity is up to and including $\frac{3}{4}$ in. bent-shank tapper taps. The weight is 72 lb., and the bench room required is 14x22 inches.

REVIEW · OF · RECENT · PATENTS

Relating to the Machinery and Metal Products Industries

Furnaces

An electric furnace, which includes an electro-magnet for determining the critical temperature of steel, is covered by patent 1,734,536 assigned to Ugine-Infra, Grenoble, of France.

Albert W. Morse, Long Island City, was granted patent 1,734,871 for a heat-treating furnace with an inner chamber for the purpose of increasing the normal radiance of the flame.

Processes

Patent 1,733,110 has been granted Joseph Brincil, Reading, Pa., covering a method of producing lined bearings by an extrusion process.

The Gleason Works is assignee of patent 1,733,399 for a method of producing gears of the spiral bevel type by a hobbing process.

Edward L. Greer, Detroit, and Thomas J. Brady of Pontiac, were granted patent 1,733,594 for a method of manufacturing a lathe center with a welded wear-resisting tip.

The Timken Detroit Axle Co. is the assignee of patent 1,734,558 for a method of making worm hobs by relieving in such a way that the tooth forms do not change after sharpening.

A process for heat-treating molten cast iron having a content of carbon plus silicon greater than 4 per cent, to cause the metal upon solidification to contain most of its carbon in fine graphitic form, is the subject of patent 1,726,433 granted to Fritz Greiner, of Stuttgart, Germany.

The process of making pliable tungsten, which has become embrittled by the absorption of hydrogen, by using the tungsten as an anode in an electrolyte which evolves nascent oxygen at the anode and hydrogen at the cathode, and preventing the dispersion of the hydrogen from the cathode to the anode is the subject of patent 1,731,269, assigned to the Westinghouse Lamp Company.

Patent 1,731,390 granted to Courtney N. Mitchell of Cleveland, Ohio, covers a method of welding the edges of metal plates by mounting a strip of metal between them and then moving the assembly past a rapidly moving heating element while pressing the edges and strip together, thereby causing metal melted from the strip to flow into union with the edges of the plates.

To the firm of Aktiengesellschaft der Maschinenfabriken Escher Wyss & Co., of Zurich, Switzerland, has been assigned patent 1,731,549 on a process for hardening high speed steel articles by packing them in finely divided silicon carbide and thereafter applying heat.

Patent 1,731,859, granted to Alvin L. Johnson, Worcester, Mass., relates to the method of making a rack, from blanks of sheet metal, having a longitudinal rib in which the teeth are cut.

The Continental Can Co. is assignee of patent 1,716,602 covering a method and means of separating stacked sheets which consists of producing a magnetic field adjacent to the stack, the flux of which so magnetizes individual sheets that they repel each other enough to effect separation.

A method of electric welding which comprises the use of an arc to heat the parts to be welded, preheating a gas to increase its volume and applying said gas to the arc and molten portion of the parts, whereby the amount of said gas consumed in the operation is reduced, is the subject of patent 1,716,614, assigned to the General Electric Co. The same patent covers a welding apparatus comprising means for controlling an electrode, for delivering a gas and an electric preheater for the gas.

Metal-Working Machinery

A balancing machine, comprising an oscillatable bed hinged at one end, and means for imparting impulses to the other end of the bed by a cam-actuated bumper block, is the subject of patent 1,731,922, assigned to the Westinghouse Electric & Manufacturing Company.

An electric welding machine, comprising fixed and movable electrodes for clamping the parts to be welded, said electrodes having extensions journaled at the end, is covered by patent 1,732,136, granted to Fred P. McBerty of Warren, Ohio.

An electroplating machine, having conveyor chains, work holders, and slidably-connected means for maintaining holders and electrodes at relatively different electric potentials, is the subject of patent 1,723,480, granted to Albert H. Hannon, of Chicago, Ill.

Patent 1,726,377, assigned to the Kearney & Trecker Corporation, relates to a transmission mechanism for relative movement between machine tool supports, and including a screw and nut arrangement with means for preventing axial lost motion.

To Joseph Zatti, Hartford, Conn., has been granted patent 1,731,087 on a metal-bending machine, having a rotatably mounted disk with a slot therein, a forming member mounted upon and movable with the disk, a follower engaging with the slot, and other co-operating parts.

The Kearney & Trecker Corporation is assignee of patent 1,726,376 on a metal-working machine combining a cut-off tool, stock bar holder and feed mechanism, and automatic means to interrupt the feed when the bar has been cut into piece lengths.

TRADE PUBLICATIONS

ARC WELDING SETS. The Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa., has issued leaflet No. 20390-B on its "Flex Arc" welding sets of the gas-engine-driven type.

SILICON-BRONZE ALLOY. The Bridgeport Brass Co., Bridgeport, Conn., has issued a bulletin on "Duronze," a silicon-bronze alloy for screw machine parts, stampings, forgings, and welded parts. A complete discussion is given on the machineability and acid-resistant properties.

TURRET LATHE SET-UPS. The Warner & Swasey Co., Cleveland, Ohio, has issued a bulletin "Down Came Our Cost," which gives savings in time and money by means of the set-ups illustrated on Warner & Swasey turret lathes. The various models in the line are illustrated and specifications given.

UNIONS, MALLEABLE IRON AND STEEL. The U. S. Department of Commerce, Bureau of Standards, has published Commercial Standard CS7-29, entitled "Standard Weight Malleable Iron or Steel Screwed Unions." The book is available from the Superintendent of Documents, Washington, D. C., for five cents.

NEWS
OF THE WEEK

A.S.M.E. Holds Semi-Annual Meeting

THE semi-annual meeting of the A.S.M.E. at Detroit drew only a fair-sized attendance to the Book-Cadillac, where some 18 sessions were held, besides many committee meetings. The Machine Shop Practice Division held two sessions, both of which were well attended. At the first J. W. Hindes and James G. Young presented a paper on "Refinements in Finishing Cylindrical Bores" in which the progress made with the method usually known as honing was clearly shown. Prof. O. W. Boston gave an interesting talk on "What Happens When Metal Is Cut," in which it was indicated that cutting was hardly the proper name for the action that takes places in removing metal in many cases. The paper elicited an animated discussion.

At the second session E. F. DuBrul outlined his proposal as to research concerning the designs of machine tools necessary to use tungsten-carbide tools to their best advantage. This was followed by "Cutting Tests With Cemented Tungsten-Carbide Lathe Tools" by T. G. Digges, the paper being presented by Mr. French owing to the illness of the author. "The Application of Tungsten Carbide to Saws" by C. M. Thompson,

Coleman Sellers 3rd

"Use of Tungsten Carbide as a Cutting Material on Heavy Machine Tools" by Coleman Sellers 3rd, and the report of the Metal Cutting Committee on tungsten carbide by Frank C. Spencer completed the session which was enlivened by both oral and written discussions. Great increases both in production and in the life of tools tipped with tungsten carbide were shown by several concrete examples. Mr. Sellers showed some interesting cases where the new tools had greatly increased output at a substantial net saving. In his experience the smoother surface shown on a tool that has been lapped comes automatically after a little use, the abrasion of the tool by the metal bearing cut securing the same results without the cost of lapping.

Mr. Sieger brought out the fact that tungsten carbide has no elasticity and that it must be mounted in a shank that

O. W. Boston

will deflect whatever amount may be necessary but still support the cutting edge without chatter. Heavy tool shanks are desirable to support the tungsten carbide properly. He also pointed out that the reason these tools did not stand up as well on steel as on cast iron or non-ferrous metals was that the abrasive action of the chips over the top of the tool wore a depression that greatly increased the top rake and weakened the cutting edge of the tool.

At the suggestion of E. J. Kearney it was resolved to outline a definite plan of research to present to all interested in the development of machine tools and economical production.

Three sessions were devoted to applied mechanics. Among the other papers were three on the properties of metals, power test codes, boiler feedwater, industrial power, paper and pulp, wood industries, fuels, management, mechanical springs, central power stations, aeronautics and education and training.

The management session had two papers beside a brief talk on safety by George Opp whose query was "Is Management Responsible for Industrial Casualties?" The paper by Crosly Field on the "Management of Small Manufacturing Plants" was of special interest to many, while large plant management problems were handled by A. B. Reynders who told how to retain the advantages of the small plant.

Many committee meetings were held, most of them looking to standardization of machine parts. Those dealing with cutting metals, spindle noses, chucks and chuck jaws, twist drills, milling machine tables, and wrench head bolts and nuts were of particular interest.

Detroit members deserve special mention for the way in which the members were entertained. Visits to many industrial plants were of special interest and the boat trip was most enjoyable. Automotive manufacturing, both for land and air, was of special interest.

* * *

Machine Tool Dealers Hold Spring Meeting

The spring convention of the Associated Machine Tool Dealers held at Granville, Ohio, discussed as its principal matter of business the sales contract developed jointly by the Association and a committee of the National Machine Tool Builders' Association. L. H. Swind, president of the Swind Machinery Co., Philadelphia, presented a report on this topic. Discussion of the experience of various dealers with the used machinery appraisal plan emphasized its growing success and its value. Omar S. Hunt, president, Marshall & Huschart Machinery Co. of Indiana, read a paper entitled "Selling Machine Tools on the Installment Plan." Homer Strong led a discussion on "Handling of Open Machine Tool Lines" and Harry Barney read a paper entitled "Reciprocity as it affects the sale of Machine Tools." Officers of the association are as follows: president, E. P. Essley, secretary, E. L. Essley Machinery Co., Chicago; vice-president, J. W. Wright, president of the Colcord Wright Machinery & Supply Co., St. Louis; secretary and treasurer, A. G. Bryant, general manager of the machinery division of Joseph T. Ryerson & Son, Inc., Chicago.

* * *

Fairbanks, Morse Plans Centenary Exercises

Fairbanks, Morse & Company is planning a centenary exercise and pageant of E. & T. Fairbanks & Company, to be held at St. Johnsbury, Vt., July 4, 5 and 6, in commemoration of the first 100 years of the building of Fairbanks scales. W. F. Hovey, president of the company, made the announcement recently.

Mergers Topic at Management Meeting

AT A DINNER of the Production Division of the American Management Association at Cleveland, on June 9, Thomas R. Jones, vice-president of the Harris-Seybold-Potter Company, presented a paper on "The Urge to Merge." To clarify his subject, the speaker used numerous examples from his own experience and others from current publications, notably *The Business Week*. In many of the instances cited the name of the company was withheld because of the confidential data used.

The speaker pointed out that while mergers have formed and will continue to form an important phase of business progress, "all is not gold that merges." In no way is consolidation a substitute for effective management. The attainment of internal economies is not the primary cause for merging. More common reasons are bad conditions of distribution, financial or promotional objectives, personal ambition, the smoothing of sales or production variations, and technical requirements. Indeed many consolidations are made between companies manufacturing such diversified products that internal economies are neither possible nor contemplated.

Mr. Jones warned that mergers not carefully conceived often result in losses due to excess assets, a superimposition of expensive overhead, a letdown in the efforts of executives, a drop in gross sales, a problem of personnel disposition, and the expense in adjusting manufacturing or sales facilities. However, when well designed, mergers produce greater stability and increased profits.

In a short address, W. J. Donald, managing director of the American Management Association, outlined the progress in association activities including the development of its ten divisions, each of which specializes on a distinctive phase of management. Oscar Grothe, vice-president, White Sewing Machine Company, introduced the speakers.

In the morning session N. M. Perris, of Stevenson, Harrison & Jordan, read a paper on "Burden Trends in Modern Management," in which he defended the growth of the so-called overhead departments. He pointed out that the ratio of burden to direct labor meant little but that the ultimate unit cost was the real criterion. A round-table discussion brought out several interesting methods devised to control indirect labor.

In the afternoon, three papers were presented: "Controlling the Cost of Planning Under Various Conditions," by W. S. Richardson, staff superintendent, mechanical goods division, Goodrich Rubber Company; "Controlling the Cost of Research, Design, and Development," by Roscoe Seybold, assistant to the president, Westinghouse Electric & Manufacturing Company; and "Controlling Costs Incident to Maintaining Quality," by William H. Bray, superintendent of methods and betterments, Automatic Electric Company. A general discussion followed each talk.

The second day of the conference opened with a paper on "How Can Account Classification Ratios and Budgets Best Contribute to Overhead Control," by E. S. La Rose, assistant comptroller, Bausch & Lomb Optical Company. The remarkable degree to which this concern has perfected sales forecasts and their use in budgetary cost control was ably described. This was followed by "How Can Accounting Be Made Sufficiently Flexible for Changes in Volume?" by E. L. Lalumier, vice-president, Armour & Company.

Wendell E. Whipp, president, Monarch Machine Tool Company, discussed "The Control of Indirect Production" in the afternoon session. Because of the absence of the second speaker, who was to have delivered a paper on "What Relation Does Overhead Bear to Net Profits?" C. S. Carney, vice-president, Trundle Engineering Company, gave an interesting talk on the same subject.

A committee meeting of the newly formed shop methods division of the association was held under the direction of P. L. Dildine, assistant to the vice-president, B. F. Goodrich and Company. A program of topics to be discussed by this division was formulated.

* * * *

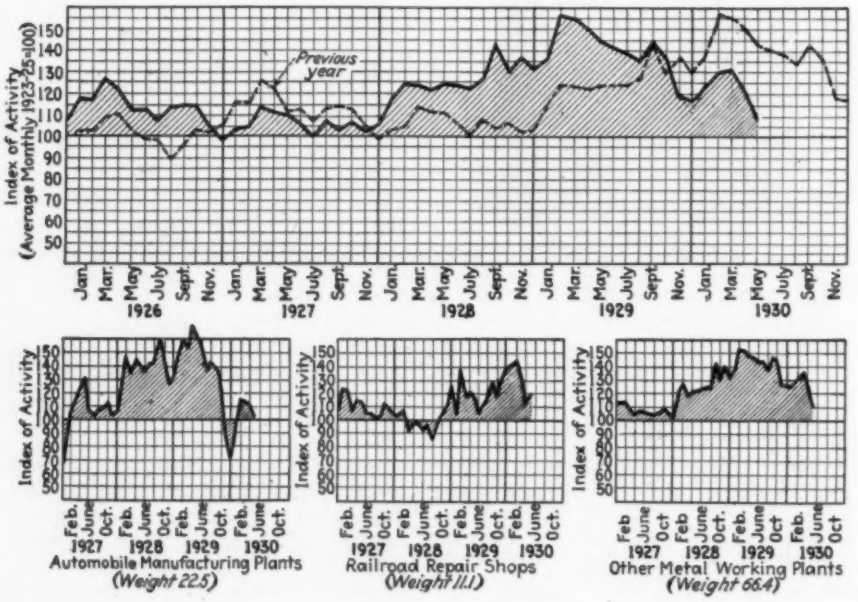
Metal-Working Operations Show Further Falling Off

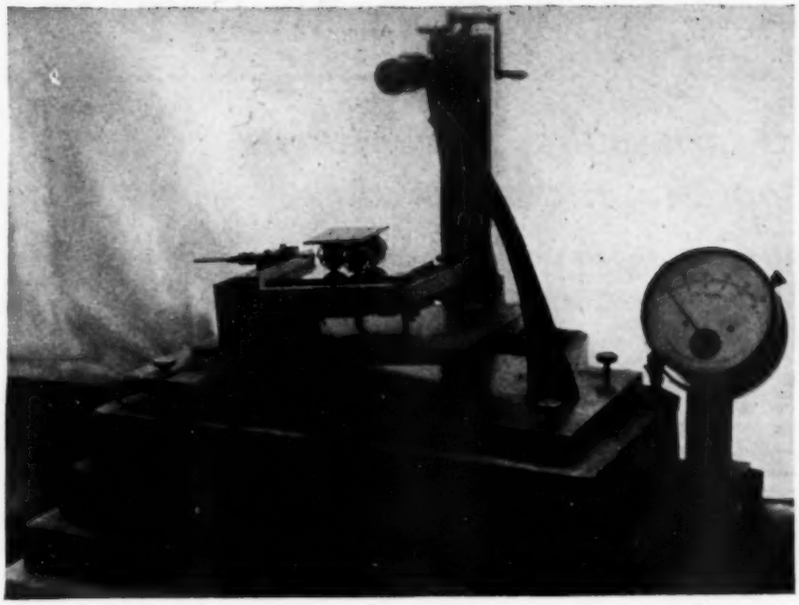
PARTIAL returns on the monthly consumption of electrical energy for power purposes indicate that the metal-working industry continued its downward trend in operations during May, reaching the lowest point reported since December, 1927. And yet, reports received indicate that approximately 15 per cent of the metal-working companies of the country are operating at a rate above that recorded during May of last year. Approximately 4 per cent are operating on a plane about 5 per cent below that of May of last year, 3 per cent between 5 and 10 per cent below those of last year, 28 per cent between 10 and 20 per cent less than last year, 25 per cent between 20 and 30 per cent under last year, and 25 per cent of the metal-working plants report current operations more than 30 per cent under May last year—all of these rates of operations being based on the comparative consumption of electrical energy for power purposes.

These partial returns indicate that the rate of operations in these plants during May was about 9.5 per cent less than that of April, was about 23.7 per cent less than that of May, 1929, and 11.8 per cent less that that of May, 1928. A decrease in rate of operations normally takes place in the metal-working industry in May, but the drop in activity during the May just closed was some 6 per cent greater than that expected.

The automobile manufacturing industry, including the manufacture of parts and accessories, appears to have suffered a 9.8 per cent decrease in rate of operations during May as compared with April, carrying the industry down to a point of activity some 36.4 per cent below that of May of last year.

Metal-working plants outside the automobile plants and railroad repair shops reported a drop in operations during May of 12.2 per cent as compared with April, or to a point about 23.6 per cent below that of May, 1929. Railroad repair shops appear to have increased operations during May by 7 per cent.





Measuring the Oiliness of Oil

This device in the Westinghouse laboratories, by means of a weighted platform supported by three polished steel balls resting on an oil-covered polished steel plate, measures the oiliness of the oil film by registering the slightest motion of the platform as the table is inclined

Germany Plans Export Price Reduction

A scheme by which Germany hopes largely to expand her export trade in the face of present European depression has been set forth by Berlin dispatches. It is simply a general 10 per cent reduction in the prices of those things which Germany sells to the world to be brought about by forthcoming cuts in wage scales and the cost of coal. The reduction is expected to be effected so quickly that Germany's competitors, with entirely different domestic problems, will not be able to meet the cut. Berlin authorities expect the American market to be among the first to feel adverse effects.

* * *

Manufactures Lead In New England

The relative importance of manufacturing in New England's economic structure is evidenced from the statement in the Domestic Commerce Division's *Industrial Structure of New England* that the average number of workers on New England manufacturing pay rolls in 1927 was 13.2 per cent of the total number so employed throughout the United States, although New England's proportion of the total population was less than 7 per cent.

Industries in which metals are the principal materials are more significant to New England as a source of income than all the textile manufactures. The metal industries in 1925 overshadowed textiles in the value added by manufacture by nearly $138,000,000 and made up almost 32 per cent of the New England total, whereas textiles represented only 27 per cent and leather and rubber manufactures but 12 per cent. Metal industries provide a manufacturing income for the region between $900,000,000 and $1,000,000,000 a year, shown by the value added by manufacture.

Specials Listed in Canadian Tariff

The new regulations governing admission to Canada under special low tariff rates for certain iron and steel machinery and electrical apparatus of a class or kind not made in Canada have been issued by the Department of National Revenue. Under the new tariff schedules of the recent Government budget, special categories are provided making duty free under British preferential tariff, 15 per cent under intermediate tariff, and 20 per cent under general tariff. Included under these categories are: (1) All machinery composed wholly or in part of iron or steel, of a class or kind not made in Canada, n.o.p. (not otherwise provided for), and complete parts thereof; (2) Engines or boilers, of a class or kind not made in Canada, and complete parts thereof, n.o.p.; (3) electrical apparatus, of a class or kind not made in Canada, n.o.p., and complete parts thereof; (4) manufactures, articles or wares, of iron or steel, of which iron or steel or both are the component materials of chief value, of a class or kind not made in Canada, n.o.p. Unless the imported goods have been ruled by the department as being of a class or kind not made in Canada, the regulations state, they are to be rated under alternative schedules which provide 15 per cent under the British preference, 25 per cent under intermediate tariff, and 20 per cent under general tariff.

* * * *

Machinery and Machine-Tool Earnings Expected to Exceed Those of 1928

THE extent to which some of the leading machinery and machine-tool manufacturing companies have been affected by the current business recession is indicated by the probable 1930 earnings of some of these companies, as estimated by the Standard Statistics Company based upon earnings for the first quarter or known operations of the various companies. The future is so uncertain, however, that it is impossible to make accurate estimation of earnings for many companies.

The manufacturers of agricultural machinery will undoubtedly experience a very favorable business for the year. During 1930 six of the largest agricultural machinery concerns are expected to earn on an average of $6.75 per common share, as compared with $5.11 in 1929, and $3.53 in 1928. The expectations for the general machinery and machine equipment concerns are not as good as for the agricultural machinery concerns, it being expected that 1930 earnings will in general be under those of 1929, but above those of 1928. The 1930 earnings per common share of seven of these companies is estimated at $5.97, as compared with $6.08 in 1929, and $4.01 the preceding year.

Following is a list of these companies with such 1930 earnings as have been estimated by the Standard Statistics Company:

EARNINGS PER COMMON SHARE

	1928	1929	1930 (Est.)
Advance Rumely Co.	0.00	d8.33	.....
J. Case Co.	26.94	20.42	.....
Deere & Company	7.39	13.52	17.00
Gleaner Comb. Harvestr. Corp.	1.38	2.63	4.50
International Harvester Co.	5.58	7.11	8.00
Massey-Harris Co., Ltd.	2.13	3.58	3.75
Minneapolis-Moline Pwr. Imp. Co.	3.56	1.87	3.50
Oliver Farm Equipment Co.	1.13	1.97	3.75
E. W. Bliss Co.	2.52	5.30	.....
Bucyrus-Erie Co.	2.43	3.70	3.00
Caterpillar Tractor Co.	4.78	6.16	9.00
Chicago Pneumatic Tool Co.	3.27	4.63	3.75
Dominion Bridge Co., Ltd.	4.16	5.45	.....
Evans Auto Loading Co.	3.77	3.34	.....
Fairbanks-Morse & Co.	4.52	5.05	.....
Federal Screw Works.	3.90	5.52	.....
Foster-Wheeler Corp.	3.01	6.34	7.00
Ingersoll-Rand Co.	7.87	10.54	9.50
Internationa. Comb. Eng.	2.75	.....	.....
Link-Belt Company	4.21	4.54	4.50
Marion Steam Shovel	1.57	3.17	.....
National Acme Company	2.41	4.17	.....
National Rubber Mach. Co.	3.70	4.06	.....
National Supply (of Del.)	9.59	11.48	.....
Niles-Bement-Pond Co.	2.47	6.63	5.00
Northwest Engineering Co.	4.64	4.82	.....
Oil Well Supply Co.	d0.57	d7.31	.....
Transue & Wms. Stl. Forg.	2.26	3.26	.....
United Shoe Mach. Corp.	3.33	.....	.....
U. S. Hoffman Mach. Corp.	4.29	2.62	.....
Worthington Pump & Mach.	d0.29	11.96	.....

d—Deficit.

BUSINESS · BAROMETER

Next business turn will be upward, with tariff uncertainties removed

By THEODORE H. PRICE
Editor, Commerce and Finance, New York

ON THE stock exchanges as well as in the commodity markets, prices tended downward last week. The decline in stocks was due to the speculative weariness that holders showed when some important corporations failed to make the favorable showing that had been expected of them, or declare the liberal dividends that had been anticipated. The weakness in the commodity markets was attributed to the fear that next year's crops may add to the unconsumed surplus, and so increase the handicap under which farmers, merchants, and manufacturers are laboring.

But this is a possibility that was just as evident eight months ago as it is today. The only difference is that optimism was in the ascendant on the 30th of September, 1929, whereas pessimism now reigns supreme. It is in fact to be doubted whether the overproduction is any greater than it was before the war or even in 1904-05 when the American cotton crop was 13,451,000 bales, and the consumption of American cotton was 11,825,000 bales.

The main difference is that manufacturers and merchants have abandoned the practice of carrying large stocks. It used to be that the jobber anticipated his requirements for six or eight months, and the retailer replenished his stocks only about twice a year. Both now buy every day, and most purchases are shipped directly to the shops from which they are sold to consumers. The result is a great economy in the use of credit; a reduction in interest charges; a stock that is always up-to-date; and a consumer public who desire to keep abreast of the latest styles, insuring a constant re-buying.

These factors are mentioned because they are generally overlooked in times like the present. Sometimes the public does not stop to compare the present with the past.

The best way to take advantage of this law and its vindication is by underwriting its operation through a purchase of a moderate quantity of each of the low-priced staples. The result would be a wide diversification of the risk and a participation in the profits that will accrue when the tide turns, and each of the commodities purchased has recovered its normal value.

It is to be doubted whether an equally attractive opportunity for the intelligent but semi-speculative investment of capital is to be found in any other direction, and it is recommended to the careful consideration of those who believe that the law of supply and demand is immutable.

The foregoing is offered in lieu of an attempt to interpret an inscrutable market, that has now reached a point at which it is buffetted by rumors that have no foundation. Such rumors should be disregarded in favor of a philosophy of common sense which suggests that the unprofitable production of which we hear so much will soon be at an end.

From this page the reader will get a quick picture of current business and industry. The boxed material below is a summary of the letters from regional correspondents of the American Machinist, published in full on the opposite page.

QUIESCENCE continues to be the outstanding characteristic of the country's machinery and machine-tool markets. There is a lingering note of optimism, although little hope is held out for any striking change in the market before fall. Most districts report no changes from week to week, and agree that the buying is principally for small single items. Inquiries are also showing a summer lag.

NEW YORK dealers report another quiet week, with sales of a few small items. Buffalo inquiries, though plentiful, give little hope of orders in the immediate future, except rumors of some purchases by Pierce-Arrow. Chicago conditions look a little more encouraging with several firms reporting better business. Detroit's market is still without life, as is general business there. Cleveland considers the failure of automobile manufacturers to step up production as a contributing factor in the slowness.

MILWAUKEE, after several weeks of depressed buying, reports a little better demand from miscellaneous sources. New England expects business purse strings to loosen with the passing of the tariff. Philadelphia conditions are likewise quiet, with inquiries also slow. Cincinnati manufacturers find the market dull and featureless and dealers found their market in about the same condition.

In the business news of the week the tariff debate takes first place, and Wall Street's conviction that the bill is a bad one that will harm instead of help the country is said by some to be the reason for the pessimism in the stock market. But this seems far fetched, as the passage of the bill has been fairly certain ever since Mr. Hoover's election. Now that the Senate has approved the act it is virtually a *fait accompli*, for no one in the know doubts that the President will sign, although he probably will take occasion to denounce many of its features. At least, tariff uncertainties have been removed, and from that viewpoint confidence ought to be stimulated.

The industrial news is not cheerful, but it is no worse than it has been, and in the midst of the pessimism engendered by the declining markets those who keep their feet on the ground realize that the next turn will be upward and that it will likely not be delayed beyond the fall or winter unless the farmer shall fail to receive a fair price for his crops. Against that contingency are the efforts of the Federal Farm Board, and if the great experiment that Uncle Sam is making achieves even temporary success the market for manufactured goods will be greatly broadened in the fall.

Meanwhile, summer is only a week away, and it would defy precedent to expect a gain in activity for some time. The steel and automobile industries are in their seasonal decline. The price of copper has been reduced again. Building still lags, and contracts awarded during May were 22 per cent less than a year ago. But retail business is fairly well maintained in-so-far as the somewhat indefinite figures available can be relied upon, and stock exchange money could be had in New York last week at 2 per cent.

The successful sale of the German reparations bonds ought to help matters in Europe. Although political instability in India and China is matched in its business effects by price declines which have impaired the purchasing power of the producers of Brazilian coffee, Cuban sugar, Malayan rubber, and Japanese silk, they will not continue to produce them indefinitely at prices below the cost of production.

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THE INDUSTRIAL REVIEW

Weekly progress of the machinery and machine-tool business

THE following reports, gathered from the various machinery and machine-tool centers of the country, indicate the trend of business in these industries and what may be expected from the future:

CLEVELAND

Local dealers and manufacturers find little in the way of new business to enthuse over. Sales for the past two weeks have been few and far between, the slight flurry that was noticeable a fortnight ago has entirely subsided and quietness now rules the market. Inquiries, even for single pieces, show a marked decline.

The failure of the automobile manufacturers to step up production has affected local auto parts manufacturers and subsequently the local machine-tool market. Competition for any tool business at the present time is too keen for profit taking.

Local dealers seem contented to sit by and admit that the summer dullness period is on and that very little can be expected until fall. June is expected to fall below the May volume.

NEW YORK

New York's machinery and machine-tool market is one of the first elements in the metropolis to feel the effect of the labors of the Noise Abatment Commission, for things are so quiet that a pin dropped in an uptown dealer's offices could be heard easily down at the Battery. There seem to be but few prospects of any change in the situation until fall, despite the efforts of salesmen. One dealer, however, has introduced a new thought—he sends his men out to interview prospects day after day, explaining that getting an interview with the men who are hard to see in times of good business is now comparatively easy, and perhaps some of the fruit sown now may bear fruit when conditions change. Desultory buying of small items was the week's only business, and inquiry possibilities are in the same condition. The Picatinny Arsenal has been asking bids, one tool at a time for a total of eight or ten small tools, including millers, lathes, and presses.

BUFFALO

Some pending inquiries for equipment, both machine tool and electrical, would be a great help if they resulted in orders in bringing business back to normal. Buffalo, usually slow to feel a depression and equally slow in recovering, is running true to form. Inquiries are more plentiful but most of those interested have little hope that much of the business will be closed before September, at least, no more than current requirements.

The report is quite definite that the Pierce-Arrow plant will be in the market for some equipment. Just how extensive these purchases will be is difficult to say at present.

Business is still quiet in Jamestown, N. Y., and no large orders from that city are expected. A change-over from 25- to 60-cycle current in the city of Dunkirk makes it advisable for some of the plants there to modernize their equipment in line with the change.

One dealer succinctly reported that he had 100 more orders and $10,000 less business in May than April. This, in a word, describes conditions rather accurately.

NEW ENGLAND

Machine-tool sales during the week showed a slight improvement. It is problematical whether or not the slight step-up will be maintained. The week, however, from a machine-tool and machinery angle, was characteristic of the situation that has faced New England for many weeks.

Officials remain reticent. A more general business improvement, in which the tariff problem is just now a mighty important factor, they believe, is needed to loosen purse strings and produce freer buying.

It is true that industrial conditions have improved in some sections. A Middletown, Conn., company has started work on a new contract to furnish automobile hub caps to a large Middle West manufacturer. A maker of heavy marine supplies had one of the best months in history during May.

DETROIT

Conditions in the machinery and machine-tool field here are showing no improvement over the past few months and in some respects business is at a lower ebb than it has been at any time this year. A few sales are being made to manufacturing plants in the other cities of the state but the Detroit market is almost lifeless, with no indication of a favorable change. Most of the automobile plants are either shut down or are planning to close within the next week or ten days. They will probably be down until the end of July or later.

Some buying is being done by municipalities and by other public service organizations but this is not of sufficient volume to maintain the optimism of dealers. There is a feeling in many quarters that the present condition will exist throughout the summer and perhaps much longer.

CHICAGO

While reports from Manufacturers' representatives and dealers engaged in the machine-tool industry do not indicate a general revival of business activity, they are more encouraging than for the last several weeks. Inquiries are reported to have taken an upward trend, and a number of sales have, rather unexpectedly, been closed. This applies to new tools, the used-tool market continuing depressed. The Chicago representative of a manufacturer of milling machines reports a recently increased call for the plant's products, a similar report coming from the local representative of a concern manufacturing turret lathes. No new lists are reported to have been received from railroad interests. Manufacturers of farm machinery continue in the market as occasional buyers of single tools, mostly for replacement uses. A recent report that the Caterpillar Traction Co., Peoria, Ill., would shortly submit a list of tools needed for production and plant enlargement seemingly was premature, the company, it is now said, having decided to postpone until later in the year the proposed improvements. The Illinois Steel Co. is making inquiry for a small lot of wood-working tools.

PHILADELPHIA

Philadelphia machinery and machine-tool business continued in the doldrums during the last two weeks, with little indication that the trade will find itself in any improved condition in the immediate future. Leaders of the industry are not making any forecast with respect to the return of normal conditions and cite the failure of any considerable number of inquiries as indication that there is nothing in sight to warrant a prediction for an early resumption of orders.

Two Philadelphia manufacturers are finishing up orders for R. C. A. Victor, both rather small purchases, and another firm received orders for portable boring equipment from Shanghai, and another for a South American company. These were the most important orders revealed during the fortnight.

Two of the larger concerns reported there are some sizeable orders pending, and have been for some weeks, but how soon there will be a closing could not be foretold.

CINCINNATI

Machine-tool manufacturers of the Cincinnati district found the general market dull and featureless during the last week. The prevailing feeling is that the recession has reached the low point and that the next change will be for the better, although considerable time may lapse before there is a great increase in the demand.

Selling agents found the market sluggish in local and adjacent territory, but were able to hold their own and had some success in the way of developing prospects for high-efficiency tools.

The orders booked in the week by the manufacturers were well diversified as to sizes and types and were well scattered over the different sections of the country. Principal buyers were miscellaneous industrial users and general machinists, whose requirements were mainly single tools and replacements. No large orders are reported by either branch of the trade.

Inquiries remained comparatively quiet, the major portion of those received being for single tools and replacements. These were well scattered over the country and were well diversified as to sizes and types of requirements.

Manufacture still remains at a fairly-good level and no important reduction of output is expected to become necessary.

MILWAUKEE

An optimistic note is evidenced in the local machinery and machine-tool market, following a more noticeable depression and a lack of buying during the past four to six weeks. The unfavorable condition in the automobile, tractor, and airplane manufacturing industries has naturally reflected itself in metal-working equipment purchasing, but there has been a fairly good demand in general lines, such as washing machine, electrical, and similar industries.

Inquiries are reported to be good from the field generally from which dealers have assumed a hopeful attitude, holding that this indicates that users are at least planning for future buying and that it is only a question of time before such prospects can be closed. Both inquiries and orders are coming in from sources that are planning expansion programs as well as for the replacement of worn-out or obsolescent machines.

Production is being fairly well maintained as shops are busy on manufacturing unfilled bookings as well as current requirements. Prices are holding uniform and steady. With an upward trend evidenced the industry in this area is decidedly hopeful for satisfactory business during June and the period following.

Conditions in the used-tool market are reported less favorable.

Business Items

The Independent Pneumatic Tool Co., 600 West Jackson Blvd., Chicago, was the purchaser of the Cochise Rock Drill Manufacturing Co., Los Angeles, instead of the Chicago Pneumatic Tool Co., as erroneously announced in last week's *American Machinist*. The plant of the Cochise Co. will be expanded, additional workmen will be employed, and the product manufacturers will be incorporated in the present line of the Independent Co., the Cochise organization being operated as a unit of the Independent Co. There will be no change in personnel.

The Square D Co., Detroit, Mich., and the Diamond Electrical Manufacturing Co., Inc., Los Angeles, were recently merged. Under the merger, the Square D will be controlled by the same executive personnel, with the addition of Vernon Brown and J. H. Pengilly, Los Angeles, as vice-presidents. The merged company will maintain the Square D name.

The Noyes & Nutter Manufacturing Co. and the Wood & Bishop Co., Bangor, Me., have merged. Both concerns will continue under the management of the Wood & Bishop organization. George H. Nutter, head of the Noyes & Nutter Company, will retire.

The Ohio Steel Foundry Co., Lima and Springfield, has purchased the steel foundry department and steel casting business of the Industrial Brownhoist Corporation, of Cleveland, Ohio, and Bay City, Mich. The steel foundry is located at Bay City. Extensive improvements are planned.

The J. J. Normoyle Co., Moline, Ill., has occupied the Oliver Chilled Plow Co. plant at Sixth St. & Third Ave., Moline, following a recent fire.

The United States Electrical Tool Co., Cincinnati, is moving its Detroit offices from the General Motors Bldg. to 4831 Woodward Ave., where it will maintain a warehouse, a service station, and a sales office.

The Norma-Hoffman Bearing Co., Stamford, Conn., has let the contract for the construction of a one and two-story plant, to cost approximately $125,000.

The Crane Co., Chicago, will observe its seventy-fifth anniversary from June 29 to July 3. Chicago will be the center of the observances.

Personals

Gardner C. Anthony, for 34 years dean of the engineering school of Tufts College, Mass., president and vice-president of the Society for the Promotion of Engineering Education, has recently been made a member of its Council.

H. Boyd Brydon, chief mechanical engineer of the Byllesby Engineering & Management Corporation and for 21 years a member of the Byllesby organization, recently resigned.

C. E. Beeson has been elected vice-president and treasurer of the Pittsburgh Steel Co., to succeed the late William C. Reitz.

E. W. Cooney, manager of the Anderson (Ind.) Engine & Foundry Co., has been elected president of the Anderson Rotary Club for the coming year.

J. A. Callahan, formerly vice-president and general manager of the Partin-Carry Corporation, and later manager of the Buffalo plant of the Curtiss-Wright Corporation, has become associated with the Briggs Manufacturing Co., Detroit, in charge of new developments.

John H. Coghlan has been appointed New England representative for the American Manganese Steel Co., Chicago Heights, Ill., with headquarters at 92 Broadway, Cambridge, Massachusetts.

C. H. L. Flinterman & Carolton M. Higbie, president and chairman respectively of the Wilcox-Rich Corporation, Saginaw, Mich., have been added to the board of directors of the Eaton Axle & Spring Co., Cleveland.

F. L. Gushard, Cedar Falls, Iowa, has been appointed factory superintendent for the Viking Pump Co., Cedar Falls, succeeding P. Chris Petersen, who will spend the summer touring in Europe. Mr. Petersen is secretary of the concern and upon his return will devote his entire attention to the duties of that position. Mr. Gushard is a co-inventor of a new rotary valve engine upon which the patent was lately issued.

H. C. Hoover, superintendent of the Springfield-Ohio plant of the Ohio Steel Foundry Co., Lima, Ohio, since early in 1928, has been transferred to Lima as superintendent. He succeeds C. M. Zipf, who has been made superintendent of the company's Bay City, Mich., plant.

Adolf R. Hopf, Jr., engineer of the Rolls-Royce-Brewster Co., Inc., Long Island City, N. Y., recently became an assistant plant engineer with the Celanese Corporation of America.

J. F. Langston has been appointed manager of the Witherow Die-Rolling Division of the Republic Steel Corporation, according to a recent announcement.

Thompson A. Lyon, for the past ten years superintendent of Davis & Hemphill Co., Elkridge, Md., has been appointed plant superintendent of the Alexander Milburn Co., Baltimore.

James L. Mahon, superintendent of the American Car & Foundry Co., Detroit, was elected president of the Detroit Foundrymen's Association at a recent meeting.

W. H. Mantz, for many years secretary, was elected president of the Newark Foundrymen's association at a meeting recently. Mr. Mantz, who is affiliated with the Atlas Foundry Co., Irvington, N. J., succeeds John L. Carter of the Sacks-Barlow Foundries, Inc. J. G. Pearce, director of the British Cast Iron Research Association, was principal speaker at the meeting. H. L. Edinger of the Barnett Foundry Machine Co., Irvington, N. J. was elected vice-president, and G. W. Hannay, also of the Barnett Foundry Co., was elected secretary to succeed Mr. Mantz. J. A. Williamson of the Isbell-Porter Co., Newark, will continue as treasurer.

Warner Seely, secretary of the Warner & Swasey Co., Cleveland, was elected president of the Cleveland Engineering Society for 1930-31 at the annual election held recently by the executive board. Mr. Seely was a former vice-president of the society. Other officers elected were: Vice-president, Orin C. Sabin, secretary of the Sabin Machine Co.; treasurer, Hugh Cook, vice-president of the Lundoff-Bicknell Co.; secretary and manager, Carlton R. Sabin, Carnegie Hall, Cleveland; and librarian, Gilbert O. Ward, head, technology division, Cleveland Library.

Frank A. Moeschl, vice-president in charge of sales for the Newport Rolling Mill Co., Newport, Ky., and the Globe Iron Roofing Co., recently completed 40 years of service with the two companies.

J. H. Morrison, vice-president of the Warren Pipe & Foundry Co., New York City, was among those injured in the accident to the Colonial Airways plane which came down in Boston Harbor on June 5.

Benjamin Nields, Jr., New York sales agent for the National Malleable & Steel Castings Co., Cleveland, has removed his offices to the Lincoln Building, 60 E. 42nd St., New York City.

John A. Northwood, director of safety at the Sparrow's Point plant of the Bethlehem Steel Co., has been appointed management's representative at that plant.

Fred L. Obert, associated for the past 36 years with the American Shipbuilding Co., has been appointed general superintendent of the Cleveland plant.

W. L. Lewis, formerly assistant comptroller of the Bethlehem Steel Corporation, has been elected vice-president, secretary, and treasurer of the Chicago Pneumatic Tool Co., New York City, succeeding J. G. Grimshaw, secretary and treasurer, resigned.

A. B. Purvis, president of Canadian Industries, Ltd., has been elected a director of General Motors of Canada, Ltd. Mr. Purvis succeeds the late William McMaster.

Franklin A. Reece has been elected president of the Reece Button Hole Machine Co., Boston, Mass., to succeed the late Francis A. Shea. John Reece was elected president of the International Button Hole Sewing Machine Co., and Franklin A. Reece treasurer. Robert H. Reece has been elected president of the Reece Folding Machine Co., with A. Warren Nichols, treasurer. Franklin Reece is secretary of the latter company.

Frank Seese, secretary-treasurer of the Marshall-Huschart Machinery Co., Chicago, celebrated his 25th anniversary with that firm on June 7. He started with the company at the age of 17 as an office boy.

John F. Taylor has been appointed Chicago district representative of the Crucible Steel Co. of America, New York City, with offices at Moline, Illinois.

Ralph Wabiszewski has been named to succeed Frank Meyers of the Maynard Electric Steel Casting Co., Milwaukee. Mr. Wabiszewski has been connected with the company for the past 12 years.

James H. Webb, vice-president and manager of Jenkins Brothers, Ltd., Montreal, has been elected vice-chairman of the Montreal branch of the Canadian Manufacturers' association.

William R. Webster, vice-president, has been elected chairman of the board of the Bridgeport (Conn.) Brass Co., and will also retain his title of vice-president. D. Swing Starring was elected a member of the board to fill a vacancy.

C. J. Zeigler has been appointed manager of the Jacksonville office of the Simplex Wire & Cable Co., 201 Devonshire St., Boston, to succeed Miss F. H. Pettee, who will be transferred to the head office in Boston.

R. C. Bird, until recently connected with the D. O. James Co., has become associated with the Chicago Steel Foundry Co., Chicago, Ill., in the capacity of sales engineer.

John E. Chiquoine, formerly with the E. I. duPont de Nemours Co., Wilmington, Del., has been added to the sales staff of the Blaw-Knox Co., Pittsburgh.

George D. Frost has been placed in charge of the New York sales office of the Brainard Steel Corporation, Warren, Ohio, which was recently opened.

Horace Armstrong, secretary and sales manager of Armstrong Bros. Tool Co., Chicago, has left on an extended business trip in Europe. On his trip Mr. Armstrong will visit twelve European countries, calling on Armstrong representatives in each.

Obituaries

Wm. E. Nickerson, 77, inventor of machinery with which the Gillette safety razors and blades are made, died on June 5 at his home in Boston, following an illness prolonged throughout the past year. He was actively connected as a vice-president with the Gillette Co. until his retirement about a year ago.

Arthur J. Selzer, commercial agent for the Westinghouse Electric Supply Co., died suddenly at Hot Springs, Va., while attending the convention of the National Electrical Manufacturers' Association.

Horace M. Jerome, chief engineer of the U. S. Pressed Steel Co., Ypsilanti, Mich., died recently at his home in Ann Arbor, Mich. He was at one time chief engineer of the Chalmers Motors Co., and was a member of the S.A.E.

Henry D. Booth, 70, former vice-president of the Midvale Steel Co., and general manager of its Nicetown plant, died at his home in Germantown, Pa., on May 29.

Milton L. Monheimer, vice-president in charge of the Eastern Division, Reliance Manufacturing Co., Chicago, died on June 5 at his home in New York City.

Edward B. Cowles, 43, an engineer associated since 1924 with the American Engineering Co., Philadelphia, died in New York City on June 8.

Roswell A. Moore, 64, secretary and treasurer of the Waterbury (Conn.) Buckle Co., died recently in Paris while on a European trip.

Edward T. Child, 58, Philadelphia, an engineer prominent in the shipbuilding and foundry industries, died on June 8, in that city, after an illness of six weeks.

Samuel B. Thorne, 57, died on June 3 in New York City. He was president of Thorne, Neale & Co. Inc., New York, and a director of the Continental Can Co., Incorporated.

James P. Groome, for fifteen years salesman in the Chicago office of Manning, Maxwell & Moore, Inc., 27 N. Jefferson St., died on June 7 after an illness of six months.

Albert Mentall, 47, superintendent of the cold-rolled strip department of the Sharon (Pa.) Steel Hoop Co., died on June 8.

Samuel Levy, president, Samuel Winternitz & Co., 38 S. Dearborn St., Chicago, Ill., died recently.

Forthcoming Meetings

AMERICAN SOCIETY FOR TESTING MATERIALS—Annual meeting, Haddon Hall, Atlantic City, N. J. June 23-27. C. L. Warwick, 1315 Spruce Street, Philadelphia, is secretary-treasurer.

STEEL FOUNDERS' SOCIETY OF AMERICA—Semi-annual convention, Greenbrier Hotel, White Sulphur Springs, Va., June 26-27. G. P. Rogers, 932 Graybar Bldg., New York City, is managing director.

SOCIETY FOR THE PROMOTION OF ENGINEERING EDUCATION—Annual convention, Montreal, Que., Canada, from June 26-28. F. L. Bishop, University of Pittsburgh, Pittsburgh, Pa., is secretary.

INTERNATIONAL CONGRESS FOR GENERAL MECHANICS — Liege, Belgium, Aug. 31 to Sept. 7. For information address Alb. Schlag, 4 Place Saint Lumbert, Liege, Belgium.

NATIONAL METAL CONGRESS—Twelfth annual Congress and Exposition, Stevens Hotel, Chicago, Sept 22-26. W. H. Eisenman, secretary of the A.S.S.T., 7016 Euclid Ave., Cleveland, Ohio, is director.

AMERICAN WELDING SOCIETY—Annual fall meeting, Congress Hotel, Chicago, September 22-26. W. M. Spraragen, 29 W. 39th St., New York, N. Y. is technical secretary.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS—Annual fall meeting of Iron & Steel Division and Machine Shop Practice Division, Stevens Hotel, Chicago, September 22-26. P. T. Wetter, 29 W. 39th St., New York, secretary.

AMERICAN INSTITUTE OF MINING & METALLURGICAL ENGINEERS — Annual fall meeting of Iron & Steel Division, Stevens Hotel, Chicago, September 22-26. T. T. Read, 29 W. 39th St., New York, N. Y., is secretary.

AMERICAN INSTITUTE OF MINING & METALLURGICAL ENGINEERS — Annual fall meeting of the Institute of Metals Division, Stevens Hotel, Chicago, September 22-26. W. M. Corse, 29 W. 39th St., New York, N. Y., is secretary.

AMERICAN SOCIETY FOR STEEL TREATING—Annual Convention, Stevens Hotel, Chicago, September 22-26. W. H. Eisenman, 7016 Euclid Ave., Cleveland.

NATIONAL SAFETY CONGRESS—Nineteenth Annual, to be held at Fort Pitt and William Penn Hotels, Pittsburgh, from Sept. 29 to Oct. 3. Metals Section meetings will be held on Tuesday and Wednesday mornings and Thursday afternoon.

AMERICAN GEAR MANUFACTURERS' ASSOCIATION — Semi-Annual meeting. Hotel Clifton, Niagara Falls, Ont., Canada, from Sept. 29 to Oct. 1.

THE WEEKLY PRICE GUIDE . . .

Rise and Fall of the Market

IRON and steel buying is unusually slow with no prospect of improvement in the situation before autumn. Structurals and pipe, however, continue to move in large quantities on orders previously placed. Dealers and consumers alike are trimming stock piles down to minimum. With inventories low, an acceleration of demand early in the fall will undoubtedly strengthen prices. Zinc and highest grade babbitt continue in the downward trend. In supplies, linseed oil was the only item to show signs of price recovery during the week.

(*All prices as of June 13, 1930*)

IRON AND STEEL

PIG IRON—Per gross ton, f.o.b.:

CINCINNATI	
No. 2 Southern (silicon 1.75@2.25)	$16.69@$18.19
Northern Basic	19.89@ 20.39
Southern Ohio No. 2	19.89@ 20.39
NEW YORK—Tidewater Delivery	
No. 2 Southern (silicon 1.75@2.25)	18.00@ 18.50
BIRMINGHAM	
No. 2 Foundry (silicon 1.75@2.25)	14.00
PHILADELPHIA	
Eastern Pa., No. 2x (silicon 2.25@2.75)	20.00
Virginia No. 2	18.75@ 19.25
Basic	22.29
CHICAGO	
No. 2 Foundry, local (silicon 1.75@2.25)	19.00
No. 2 Foundry, Southern (silicon 1.75@2.25)	18.20
PITTSBURGH, including freight charge ($1.76) from Valley:	
No. 2 Foundry	19.63@ 20.13
Basic	19.63@ 20.13
Bessemer	20.76

IRON MACHINERY CASTINGS—Cost in cents per lb. of 100 flywheels, 6-in. face x 24-in. dia., hub not cored, good quality gray iron, weight 275 lb.:

Detroit	4.50
Cleveland	5.00
Cincinnati	4.50
New York	5.25
Chicago	4.50@4.75

SHEETS—Quotations are in cents per pound in various cities from warehouse; also the mill base in large lots:

Blue Annealed*	Pittsburgh Mill Base	Chicago	Cleveland	New York
No. 10	2.00	3.35†	3.25	3.50@3.60†
No. 12	2.05	3.45†	3.30	3.55@3.65†
No. 14	2.15	3.55†	3.40	3.60@3.70†
No. 16	2.25	3.65†	3.50	3.70@3.80†
Black				
Nos. 18 to 20	2.30@2.35	3.85†	3.55	3.45@3.70
No. 22	2.45@2.50	4.00†	3.70	3.60@3.85
No. 24	2.50@2.55	4.05†	3.75	3.65@3.90
No. 26	2.60@2.65	4.15†	3.85	3.75@4.00
No. 28	2.75@2.80	4.75†	4.00	3.90@4.15
Galvanized				
No. 10	2.50	3.90†	3.80	3.55@3.80
Nos. 12 to 14	2.60	4.00†	3.90	3.65@3.90
No. 16	2.70	4.10†	4.00	3.75@4.00
No. 18	2.85	4.25†	4.15	3.90@4.15
No. 20	3.00	4.40†	4.30	4.05@4.30
No. 22	3.05	4.45†	4.35	4.10@4.35
No. 24	3.20	4.60†	4.50	4.25@4.50
No. 26	3.45	4.85†	4.75	4.50@4.75
No. 28	3.70	5.10†	5.00	4.75@5.00

*Light Plates. †Up to 3,999 lb.

WELDED STEEL PIPE—Warehouse discounts are as follows:

	New York Black	New York Galv.	Cleveland Black	Cleveland Galv.	Chicago Black	Chicago Galv.
1 to 3 in. butt	56.02%	43.48%	53.3%	42.3%	57.3%	44.8%
3½ to 6 in. lap	52. 6%	40.06%	50.8%	37.8%	53.9%	41.4%

WROUGHT-STEEL PIPE LIST

Size, Inches	List Price per Foot	Diameter in Inches—External	Diameter in Inches—Internal	Thickness Inches
1	$0.17	1.315	1.049	.133
1¼	.23	1.66	1.38	.14
1½	.27½	1.9	1.61	.145
2	.37	2.375	2.067	.154
2½	.58½	2.875	2.469	.203
3	.76½	3.5	3.068	.216
3½	.92	4.0	3.548	.226
4	1.09	4.5	4.026	.237
5	1.48	5.563	5.047	.258
6	1.92	6.625	6.065	.28
8	2.50	8.625	8.071	.277

SEAMLESS STEEL TUBING—Following net prices are for seamless mechanical tubing, cold drawn, round, .10 to .30 carbon, at New York warehouse in lots of less than 100 ft. or 100 lb.:

Thickness—Decimal	B.w.g. and Fractions	Outside Diameter in Inches—⅛	¼	⅜	½	⅝	1	1¼	1½
		Price per Foot							
.035″	20	$0.15	$0.16	$0.17	$0.18	$0.19	$0.21	$0.23	
.049″	18	.17	.18	.19	.20	.21	.23	.25	
.065″	16	.19	.20	.21	.22	.23	.25	.27	
.083″	14	.20	.22	.23	.24	.25	.27	.29	
.095″	13	.21	.23	.25	.26	.27	.29	.31	
.109″	12	.22	.24	.26	.27	.28	.30	.32	
.120″ or .125″	11	.23	.25	.27	.28	.29	.31	.33	
.134″	10	.24	.26	.28	.29	.30	.32	.34	

MISCELLANEOUS—Warehouse base prices in cents per lb.:

	New York	Cleveland	Chicago
Spring steel, light*	4.50	4.65	4.65
Spring steel, heavier	4.00	4.00	4.00
Coppered Bessemer rods	6.05	6.00	6.20
Hoop steel	4.25†	4.00	3.75†
Cold rolled strip steel	6.25	6.00	6.10
Floor plates	5.10†	5.30	5.00†
Cold fin., round or hexagon‡	3.40	3.65	3.35
Cold fin,, flat or square‡	3.90	4.15	3.85
Structural shapes	3.30†	3.00	3.10†
Soft steel bars	3.25†	3.00	3.00†
Soft steel bar shapes	3.25†	3.00	3.00†
Soft steel bands	3.75†	3.65	3.20†
Tank plates	3.30†	3.00	3.10†
Bar iron (2.75 at mill)	3.24	3.00	3.00
Drill rod (from list)	60%	55%	50%

*Flat, $\frac{5}{16}$-in. thick by ¾-in. wide. †Up to 3,999 lb., ordered and released for shipment at one time. ‡Cold finished steel, shafting and screw stock.

Electric welding wire at New York warehouse—$\frac{3}{32}$, 8.35c. per lb.; ⅛, 7.85c. per lb.; $\frac{5}{32}$ to ¼, 7.35c. per lb.

METALS

Warehouse Delivery Prices in Cents Per Lb. for Small Lots:

Copper, electrolytic, New York			14.50
Tin, Straits, pigs, New York			34.00@35.00
Lead, pigs, E. St. Louis	5.40	New York	6.50@ 7.00
Zinc, slabs, E. St. Louis	4.57½	New York	6.25@ 7.25

	New York	Cleveland	Chicago
Antimony, slabs	10.25@10.75	10.50	11.50
Copper sheets*	22.75	22.75	22.75
Copper wire*	15.00	15.12½	15.12½
Copper, drawn, round*	21.25	21.25	21.25
Copper tubing*	25.00	25.00	25.00
Brass sheets, high*	19.75	19.75	19.75
Brass tubing, high*	24.75	24.75	24.75
Brass rods, high*	18.00	18.00	18.00
Brass wire, high*	20.25	20.25	20.25

*Mill, base.

SHOP MATERIALS AND SUPPLIES

METALS—Continued

	New York	Cleveland	Chicago
Aluminum ingots, 99%.....	25@26	24.30	24.30
Zinc sheets (casks).....	10.25@10.75	11.75	10.11
Solder (½ and ½).....	25.25	25.50	26@28
Babbitt metal, delivered in case lots, New York, cents per lb.:			
Genuine, highest grade.....			50.00
Commercial genuine, intermediate grade.....			37.00
Anti-friction metal, general service.....			31.00
No. 4 babbitt, f.o.b.....			11.00

NICKEL AND MONEL METAL—Price in cents per lb., base, f.o.b. Huntington, W. Va.:

	Nickel	Monel Metal
Sheets, full finished.....	52.00	42.00
Sheets, cold rolled.....	60.00	50.00
Strip, cold rolled.....	55.00	45.00
Rods, hot rolled.....	45.00	35.00
Rods, cold drawn.....	50.00	40.00
Tubing.....	75.00*	90.00†
Angles, hot rolled.....	50.00	40.00
Plates.....	52.00	42.00

*Seamless. †Welded.

OLD METALS—Dealers' purchasing prices in cents per pound, f.o.b. cars:

	New York	Cleveland	Chicago
Crucible copper.....	10.00@10.25	10.00	9.25@ 9.75
Copper, heavy, and wire..	9.00@ 9.25	9.75	8.50@ 9.00
Copper, light, and bottoms	7.50@ 7.75	9.50	7.50@ 8.00
Heavy lead.....	4.00@ 4.12½	4.00	3.50@ 4.00
Tea lead.....	2.00@ 2.25	3.00	2.50@ 3.00
Brass, heavy, yellow.....	5.00@ 5.25	6.00	5.00@ 5.50
Brass, heavy, red.....	7.50@ 7.75	8.75	7.50@ 8.00
Brass, light.....	4.00@ 4.25	5.00	4.50@ 5.00
No. 1 rod-brass turnings.	5.50@ 5.75	6.00	6.00@ 6.50
Zinc.....	2.00@ 2.25	1.25	1.75@ 2.00

TIN PLATES—Charcoal—Bright—Per box:

	New York	Cleveland	Chicago
"AAA" Grade:			
IC, 14x20.....	$12.10	$11.95	$11.50
"A" Grade:			
IC, 14x20.....	9.70	9.90	9.50
Coke Plates—Primes—Per box:			
100-lb., 14x20.....	6.45	6.10	7.00
Terne Plates—8-lb. Coating—Small lots—Per box:			
IC, 14x20.....	7.75@8.00	7.00	7.50

MISCELLANEOUS

	New York	Cleveland	Chicago
Cotton waste, white, per lb.....	$0.13	$0.16	$0.15
Cotton waste, colored, per lb....	.09½	.12	.12
Wiping cloths, washed, white, per lb.....	.13½	38.00 per M	.16
Sal soda, per lb.....	.01¾	.02	.02
Roll sulphur, per lb.....	.028	.03½	.04
Linseed oil, raw, in 1 to 4 bbl. lots, per lb.....	.148	.164	.15
Cutting oil, about 25% lard, in 5 gal. cans, per gal.....	.65	.60	.65
Machine oil, medium-bodied (55 gal. steel bbl.) per gal.....	.33	.36	.24
Belting—Present discounts from list in fair quantities (½ doz. rolls) for leather or rubber:			
Leather—List price, 24c. per lin.ft., per inch of width, for single ply:			
Medium grade.....	30–10%	30–10%	35%
Med. grade, heavy wgt.....	30%	30 –5%	30%
Rubber transmission, 6-in., 6 ply, $1.83 per lin.ft.:			
First grade.....	50%	50–10%	50%
Second grade.....	60%	60– 5%	50–10%

Comparative Warehouse Prices

New York	Unit	Current Price	Four Weeks Ago	One Year Ago
Soft steel bars.....	per lb.	$0.0325	$0.0325	$0.0325
Cold drawn shafting..	per lb.	.034	.034	.035
Brass rods.....	per lb.	.18	.18	.2125
Solder (½ and ½).....	per lb.	.2525	.2575	.32
Cotton waste, white..	per lb.	.13	.13	.10@.13½
Disks, aluminum oxide mineral, cloth, No. 1 6-in. dia.....	per 100	4.59	4.59	3.60
Lard cutting oil.....	per gal.	.65	.75	.55
Machine oil.....	per gal.	.33	.33	.33
Belting, leather, medium.....	off list	30–10%	30–10%	30–10%
Machine bolts, up to 1x30 in., full kegs....	off list	50–10%*	50–10%*	50–10%*

*List prices as of April 1, 1927

MISCELLANEOUS—Continued

	New York	Cleveland	Chicago
Abrasive materials — Standard grade, in sheets 9x11 in., No. 1, per ream of 480 sheets:			
Flint paper*.....	$6.03	$6.03	$6.03
Emery cloth*.....	25.87	25.87	25.87
Disks, aluminum oxide mineral, 6 in. dia., No. 1, per 100:			
Paper†.....	2.61	2.61	2.61
Cloth†.....	4.59	4.59	4.59
Fire clay, per 100 lb. bag.....	1.00	.75	.75
Coke, prompt furnace, per net ton....	Connellsville,		2.50
Coke, prompt foundry, per net ton....	Connellsville,		3.50@4.85
White lead, dry.....	100 lb. kegs...	New York,	13.75
White lead, in oil.....	100 lb. kegs...	New York,	14.25
Red lead, dry.....	100 lb. kegs...	New York,	13.75
Red lead, in oil.....	100 lb. kegs...	New York,	15.25

*Less than 3 reams. †Less than 200.

SHOP SUPPLIES

Discounts from new list dated Apr. 1, 1927, applying on immediate deliveries from warehouse stocks in New York and vicinity:

Machine bolts:	
Up to ¾-in. x 6-in., full kegs, list less.....	60%
Larger, up to 1 x 30-in., full kegs, list less.....	50–10%
Less than full kegs or case lots, add to list.....	10%
Fitting-up bolts: list less.....	45%
Lag screws:	
Up to ½-in. x 6-in., list less.....	60%
Larger, list less.....	50–10%
Less than full keg or case lots, add to list.....	10%
Rivets:	
Structural, round head, full kegs, net.....	$4.50
Structural, round head, broken kegs, net.....	6.00
Tank, 7/16-in. dia. and smaller, list less.....	60%
Nuts:	
Hot pressed, square or hexagonal, blank or tapped:	
Full kegs up to 1-in., incl., list less.....	60%
Larger, up to 3-in., list less.....	40–10%
Less than keg or case lots, add to list.....	10%
Washers:	
Wrought, full kegs, per 100 lb., list less.....	$4.00
Wrought, broken kegs, per 100 lb., list less.....	2.00
Turnbuckles:	
With stub ends, list less.....	20%
Without stub ends, list less.....	50%
Chain:	
Proof coil, base, per 100 lb., net.....	$8.50
Cast iron welding flux, per lb., net.....	.35
Bronzing flux, per lb., net.....	.50

MACHINE REQUIREMENTS AND INDUSTRIAL CONSTRUCTION

Equipment Wanted

Calif., Richmond—Ford Motor Co., Dearborn, Mich.—assembly plant equipment for proposed 1 and 2 story plant here.

Conn., Westport—Town, M. Lefler Supt. of Schools—manual training equipment for proposed 2 story school on Bridge St. Estimated cost $200,000.

D. C., Washington — A. L. Flint, General Purchasing Officer of the Panama Canal—will receive bids until June 27, for electric drills, woodworking machine, etc.

Mass., East Cambridge—J. L. Gleason & Co., 207 Bent St.—electric hammers and electric drills.

Mass., Roxbury (Boston P. O.) — Dept. of School Building—vocational equipment for girls high school here. Estilated cost $1,500,000.

Mich., Bay City—Ohio Steel Foundry Co.—open hearth furnaces for proposed 1 story, 70 x 70 ft. addition to foundry. Estimated cost $75,000.

O., Ironton—Chaffin Mfg. Co., E. T. Atkins, Gen. Mgr. (automobile parts)—lathe, 18 in. drill press, automatic machine and air compressor.

Utah, Beaver—American Smelting & Refining Co., McCornick Bldg., Salt Lake City, A. H. Means, Mgr.—370 ft. compressor, electric hoist, head frame and foundations at Frisco-Lulu mine in Beaver county.

Opportunities for Future Business

Calif., Burbank—First National Studios, is having plans prepared for movie studio buildings including garage, mills, carpenter shops, miscellaneous shops, etc. Estimated cost $2,500,000. Private plans.

Calif., Stockton—Fisher Bros. Planing Mill, plans to rebuild planing mill destroyed by fire. Estimated cost $50,000.

Calif., Compton—Gregg Steel Products Co., awarded contract for the construction of a 1 story, 50 x 80 ft. factory and shops.

Colo., Pueblo—Colorado Fuel & Iron Co., c/o W. A. Maxwell, Jr., Mgr., has work under way on remodeling of blast furnaces in connection with steel works improvements. Estimated cost $200,000. Work will be done by day labor.

Conn., Hartford—Bush Mfg. Co., 100 Wellington St., awarded contract for the construction of a factory for the manufacture of airplane radiators. Estimated cost $40,000.

Conn., Hartford — Superior Spring & Mfg. Co., 373 Washington St., awarded contract for a 2 story, 60 x 130 ft. factory. Estimated cost $65,000. Noted Apr. 3.

D. C., Washington—O. J. Maigne Co., 356 Pearl St., New York, N. Y., manufacturers of printers rolls, will not construct plant on Georgia Ave. here. $100,000. Dodge & Morrison, 160 Pearl St., New York, Archts. Project in abeyance. Maturity in late fall. Noted June 12.

Ind., Fort Wayne—General Electric Co., 1635 Broadway, awarded contract for the construction of a factory at Writter St. Estimated cost $41,000.

Ind., Fort Wayne — International Harvester Co., 606 South Michigan Ave., Chicago, Ill., awarded contract for a 60 x 100 ft. addition to factory here. Estimated cost $50,000. Noted June 12.

Ind., Hammond—P. W. Meyu, awarded contract for the construction of a service station at State and Calumet Sts. Estimated cost $40,000. Noted June 12.

Ind., Indianapolis—Lincoln Oil Co., awarded contract for a service station at Kessler Blvd. and Lafayette Rd. Estimated cost $42,000.

Ind., Rushville—Mullins-Gibson Co., awarded contract for the construction of a foundry. Estimated cost $40,000.

Ia., Des Moines — Chicago, Rock Island & Pacific Ry. Co., La Salle St. Station, awarded contract for a 12 stall addition to round house at East 24th, Court and Market Sts. Estimated cost $60,000. W. H. Petersen, Chicago, Ill., Ch. Engr.

Md., Lock Haven—Maryland Training School for Boys, received lowest bid for the construction of a 2 and 3 story, 133 x 192 ft. educational and vocational building from Davis Construction Co., 9 West Chase St., Baltimore. $175,000.

Mass., Brighton — Commonwealth Garage, Brighton Ave., will soon receive bids for reconstruction of and alterations to repair shop and service station at Brighton Ave. and Lindon Sts. Estimated cost $40,000. W. F. Bryant & Son, 334 Washington St., Brookline, Engrs.

Mass., Brockton — Eastern Massachusetts Street Railway, 38 Chauncy St., Boston, plans reconstruction of car house into bus garage. Estimated cost $50,000. Private plans.

Mass., Cambridge (Boston P. O.)—W. Galvin, 30 Brattle St., is receiving bids for a 1 story, 65 x 90 ft. repair and service garage at 15-17 Bennett St. Estimated cost $40,000. Private plans.

Mass., Dorchester (Boston P. O.)—American International Engineering & Equipment Assoc. Syndicate, c/o J. H. Hodsdon, 53 State St., Boston, Engr., is having preliminary surveys made for the construction of a 12 story ship and railroad terminal including nine buildings, railroad yards, etc., on Mount Vernon St., here. Estimated cost to exceed $40,000.

Mass., Lynn—G. M. Mendelsohn, 14 Central Ave., awarded contract for a 1 story, 50 x 110 ft. repair and service garage at 833 Washington St. Estimated cost $40,000.

Mass., Marblehead—Electric Light Dept., is having plans prepared for the construction of a 2 story service building on Commercial St. Estimated cost $40,000. W. H. Quiner, 75 Pleasant St., Archt.

Mass., Quincy (Br. of Boston)—Vulcan Tool Mfg. Co., 41 Liberty St., awarded contract for addition and alterations to factory.

Mass., Somerville (Boston P. O.)—Somerville Auto Body Shop, 643 Broadway, awarded contract for the construction of a 1 story, 50 x 100 ft. shop on Boston Ave. Estimated cost $40,000.

Mass., Westfield — City is having revised plans prepared for a 3 story, 75 x 180 ft. boys trade school on Bartlett St. Estimated cost $175,000. M. W. Maloney, 23 Pearl St., Springfield, Archt.

Mass., Wrentham—Dept. of Mental Diseases, will soon award contract for remodeling service building at State School. Estimated cost $40,000. Kendall, Taylor & Co., 209 Columbus Ave., Boston, Archts. Noted May 1.

N. J., Fort Lee — G. W. Dexter, 201 Main St., Archt., will receive bids about July 15, for a 1 story, 25 x 240 ft. machine shop and 20 x 200 ft. shipping building for Consolidated Film Industries Inc., Lemoine Ave. Estimated cost $75,000. Noted June 12.

N. J., Hawthorne—J. C. Van Vlandren, 140 Market St., Paterson, Archt., will receive bids about July 1, for a 2 story, 90 x 140 ft. garage at Nelson and Pasadena Aves. for S. Braen, 115 Totawa Ave., Paterson. Estimated cost $150,000.

N. J., Montclair—White Motor Sales Inc., 640 Bloomfield Ave., will not construct 2 story garage, etc. on Grove St. $150,000. Lewis & Leonard, 51 East 42nd St., New York, Archts. Project abandoned. Noted May 8.

N. Y., Brooklyn—Hillel Devorkin, 1626 East 10th St., is having sketches made for the construction of a 2 story service garage on West 37th St. Estimated cost $40,000. M. A. Cantor, 124 Livingston St., Archt.

N. Y., Brooklyn — Romar Building Co., 451 Albany Ave., is having sketches made for the construction of a 100 x 100 ft. garage at Underhill Ave. and Bergen St. Estimated cost $50,000. I. Adelsohn, 26 Court St., Archt.

N. Y., Jamaica—Derbon Auto Sales Co., 226-15 Merrick Rd., is having sketches made for the construction of a service garage, etc. at 227th St. and Merrick Rd. Estimated cost $40,000. L. Danaucher, 159-10 Jamaica Ave., Archt.

N. Y., Long Island — Brooklyn & Queens Transit Co., 385 Flatbush Ave., Brooklyn, is having sketches made for the construction of a car repair shop on De Kalb Ave. Estimated cost $75,000. H. J. Kolb, c/o owner, Archt.

N. Y., Long Island City — Welsh Bros., 27 Purvis St., will soon receive bids for a 1 story, 140 x 200 ft. service garage at 47th Ave. and 36th St. Estimated cost $50,000. J. Baker, 9 Jackson Ave., Archt. Noted May 29.

N. Y., New York—N. Boris, 1671 Longfellow St., Brooklyn, will receive bids after Jan. 1, 1931, for a 2 story, 125 x 171 ft. service garage at 729 West 186th St. here. Estimated cost $150,000. C. Goodman, 375 Fulton St., Brooklyn, Archt. Noted May 22.

N. Y., New York — Central Foundry Co., 420 Lexington Ave., subsidiary of Universal Pipe & Radiator Co., awarded contract for the construction of a foundry between East 140th and 144th Sts. Estimated cost to exceed $40,000.

N. Y., New York—Corcoran-Fitzgerald & Co., 304 East 64th St., is having sketches made for a 100 x 100 ft. service garage at 304 East 64th St. Estimated cost $200,000. H. Levy, 1775 Broadway, Archt.

N. Y., New York — Samay Realty Co., S. Snow, Pres., 225 West 34th St., will receive bids after June 23, for the construction of a garage at 13th St. and Ave. A. Estimated cost $200,000. W. C. Sommerfeld, 31 Union Sq., Archt.

O., Cincinnati—Weil & Hodesh, c/o Rendigs, Panzer & Martin, Southern Ohio Bank, Archts. and Engrs., received lowest bid for a 7 story, 100 x 111 ft. garage on 7th St. from Parkway Construction Co., Provident Bank. Estimated cost $200,000.

O., Cleveland—Harshaw Chemical Co., D. T. Perry, Secy. and Treas., 1945 East 97th St., had plans prepared for a 1 story, 80 x 80 ft. foundry at 1000 Newburgh Ave. Estimated cost $40,000. Private plans.

Pa., Bradford — Rickerson & Pryde Inc., 4 Boylston St., will soon receive bids for a 1 and 2 story, 113 x 200 ft. service station at 50 East Main St. Estimated cost $150,000. T. K. Hendryx, Tidewater Bldg., Archt. Noted Apr. 3.

Pa., Erie — Metric Metal Works, 10th and Payne Sts., awarded contract for a 2 and 3 story, 55 x 100 ft. factory. Estimated cost $40,000. Work will be done by owner's forces.

Pa., Philadelphia — White Bros. Smelting Corp., Richmond and Hedley Sts., plans the construction of a 1 story, 60 x 160 ft. plant at Hedley and Myrtle Sts. Estimated cost $30,000. Private plans.

R. I., Pawtucket — United Electric Railway Co., 100 Fountain St., Providence, awarded contract for a 1 story, 130 x 215 ft. bus terminal and repair shop on Newell Ave. here. Estimated cost $140,000.

Utah, Bingham—Jordan School Dist., Sandy, is having preliminary plans prepared for a 3 story high school including shop, etc. here. Estimated cost $350,000. Scott & Welsh, Dooley Bldg., Salt Lake City, Archts.

Wash., Seattle — Albatross Steel Equipment Co., 557 Market St., San Francisco, Calif., plans the construction of a factory here.

Ont., Toronto — Shell Co. of Canada Ltd., Federal Bldg., awarded contract for an oil storage plant including garage, warehouse, etc. Estimated cost $100,000.